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attempts were made to introduce them every where. They were given to electric bodies, and the magnet also must have its share. Afterwards the idea suggested itself of simple effluvia of magnetic matter, the moleculæ of which advanced towards each other, or took a retrograde motion, according to the manner in which the respective effluvia of two magnets met. There were supposed to be in the iron a kind of small hairs that performed the office of valves, to aid the passage of the fluid in one way, and to oppose its passage when it presented itself in a contrary direction. Such was, among others, the opinion of Dufay; and this philosopher, who had seen so clearly the principle of electric motion, when he came to apply it to magnetism, presented a machine of his own invention, instead of the mechanism of nature.

3. Æpinus was the first, who, to explain the phenomena of magnetism, made use of simple powers subjected to calculation. The idea which served as the basis of his theory was suggested to him while holding a tourmalin in his hand. He had discovered, that the effects of this stone were the result of electricity, and had remarked, that it repelled on one side, and attracted on the other, a small electrised body. To these two sides he gave the name of poles, and this appellation, which might have passed for a convenient mode of expression only, became the word really expressive of the thing. He saw in the tourmalin a kind of small electric magnet, and comparing the phenomena of real magnets with those of idio-electric bodies, he found, that the action of the two fluids might be reduced to the same laws; and thus added to the merit of having improved the theory of electricity, and created, as it were, the theory of magnetism, that of combining in the same link these two grand portions of the chain of human science.

Coulomb, receiving from the hands of Æpinus the first of these theories to give it a new modification, thereby contracted a sort of engagement to improve the second also; and it will presently be seen, from the sketch we shall give of his results, with what fidelity he has acquitted himself.

I. General Principles of the Theory of Magnetism.

4. Though the magnetic fluid is governed by the same laws as the electric fluid, there are several things, in the present state of our knowledge, that indicate a difference between them. Iron and one or two other metallic substances, are the only bodies that have hitherto exhibited unequivocal signs of magnetism, whereas all bodies are susceptible of the electric virtue. If an electrised tourmalin be presented to a magnetised needle freely suspended, whatever may be the direction of the two bodies as to the poles, the tourmalin exercises on the needle, to alter its position, the same attractive force only that it would exercise on any other body; which implies, that its presence gives rise in the needle itself to an electric virtue independent of the magnetic virtue.

5. The correspondence between the two theories leads us further to consider the magnetic fluid as composed of two distinct fluids, combined together in iron that exhibits no sign of magnetism, and existing apart in that which has undergone a state of magnetism. The moleculæ of each fluid also repel one another, and attract those of the other fluid; and Coulomb has proved, as we shall presently see, that these different actions follow the inverse ratio of the square of the distance.

6. All the natural fluid of the magnetic body, even after its decomposition, remains in the interior of that body; and, in this view, magnets may be assimilated to idio-electric bodies. The two fluids disengaged from the state of combination, take contrary movements towards the extremities of the magnet, and thus exhibit actions analogous to those of vitreous and resinous electricity.

But, before we proceed further, let us take a general view of magnetism as it presents itself in all its extent; for to understand well the development of the theory, it is necessary to have at least an idea of it as a whole.

7. All the phenomena that magnets which have been subjected to experiment have furnished, are only so many different aspects, as it were, of a fundamental fact, that has long been remarked. It consists in this, that if we take at pleasure one of the extremities of a magnet, and apply it to the two extremities of another magnet, there will be attraction on one part and repulsion on the other between the two magnets. The opposed extremity of the first magnet will produce on those of the other magnet inverse effects. In general there is in every magnet two opposite points, that exhibit contrary actions and to which the name of poles has been given. We may judge of the energy of these contrary influences, by making a magnet act in presence of a magnetised needle freely suspended; the extremities of this needle will make different circuits, and sometimes a complete revolution, to find the position required by the equilibrium.

8. Now we have a phenomenon, extremely remarkable by its continuity and the immense distances to which it extends itself, in the terrestrial globe, which performs, relatively to a magnetised needle, the same function as the magnet in the instance we have just mentioned: so that the needle, left to the influence of this vast magnetic body, takes a direction from north to south, and which we see to be that which accords with the manner of acting of this same governing influence. For if, when the needle is at rest, we alter its position, it never fails, after a few oscillations, to return to it again. What would have been the sentiments of the ancient philosophers, who already ascribed a soul to magnets, though they knew nothing of their powers of action but in circumstances of contact, had the idea occurred to them of suspending one of these bodies to a thread?

9. What we have remarked in the preceding paragraph, leads to an observation that we conceive to be interesting, relative to the manner of denominating the two fluids which compose the magnetic fluid, as well as the poles in which their powers of action reside. The mere mention of the hypothesis relative to the existence of these fluids is sufficient to enable us to understand that the magnetic repulsions, similar in this respect to electric repulsions, are ascribable to those which exist between homogeneous fluids, and the attractions to those which heterogeneous fluids exert on one another. It follows from this, that when a magnetised needle is in its natural direction, the pole of that needle, which is turned to the north, is in the opposite state to that of the pole of our globe, which is in the same quarter; and as this last-mentioned pole ought to be the true north pole relative to magnetism,

that were successively twice, three times, four times, &c. 35 degrees, the needle deviated 2 degrees, 3 degrees, 4 degrees, &c. from its magnetic meridian, and thus, by taking from each impressed torsion the number of degrees which the distance of the needle from the meridian gave—that is to say, the quantity by which the torsion of the wire was counteracted, by virtue of the movement of the needle—he found that the force of the needle, to react against each torsion, amounted to as many times 35 degrees, as there were degrees in the arch measuring the distance of the needle from the meridian, proving indeed that the magnetic repulsions follow the inverse ratio of the squares of the distances.

2. *Magnetic Attractions and Repulsions.*

18. Having proceeded thus far on our subject, we are now capable of explaining the phenomena produced by magnets in consequence of their mutual actions. This explanation will in reality be very little more than expressing in other words the effects exhibited by idio-electric bodies, of which one part is in a vitreous, and the other in a resinous state, and particularly the tourmalin. We may suppose, if we please, that the boreal fluid of a magnet performs the same function as the vitreous fluid of the tourmalin, and the austral as the resinous fluid. On this supposition the resemblance of the phenomena, in the two branches of science, is limited to those which the two bodies exhibit, having each its natural quantity of fluid only, which may indeed be decomposed, but can never be either increased or diminished. Of consequence there will be this distinguishing character between the two fluids, that the electric fluid passes freely from one body to another, and, in certain circumstances, exhibits itself to the eye by sparks and streams of light, while the magnetic fluid acts in silence, and becomes perceptible only by the movements it occasions in other bodies placed within its sphere of attraction or repulsion. But if this mode of acting does not furnish the hope of phenomena equally striking with those which electricity affords the phenomena it does exhibit should on that account be the more closely studied by the naturalist, since the more a cause would affect to conceal itself, the greater would be the sagacity of those who should succeed in penetrating the mystery.

19. When two pieces of iron, A and B, placed near each other, are in the natural state, their equilibrium, like that of bodies which evince no sign of electricity, depends upon four forces that mutually destroy one another. Confining ourselves to the existence of these forces in the body A: since all action is reciprocal, we must conceive the austral fluid of this body to act by attraction on the boreal fluid of B, and by repulsion on its austral fluid; and that, on the other hand, the boreal fluid of A acts by attraction on the austral fluid of B, and by repulsion on its boreal fluid. A mode of reasoning similar to what we adopted relative to electrical actions will prove that the four forces in question are equal to one another; and as there are two attractions and two repulsions, it follows that all the forces are in equilibrium.

20. When the two idio-electric bodies, having their parts in opposite states, are brought near each other, they attract by their differently electrised sides, and repel by the sides similarly electrised. In the same manner, if two magnets, M, N, (fig. 1, pl. 101), be so placed as to each other, that M turns its boreal pole, B, towards the austral pole *a*, of the magnet N; the boreal fluid of B, for example, being at a shorter distance from the magnet N, than the austral fluid of A, we may consider the magnet M as being wholly in the boreal state, by virtue of a force, B′, equal to the difference between the forces of A and of B; and as the force B′ acts by attraction on the austral fluid of the pole *a* more than it does on the boreal fluid of *b* which is farther from the magnet M, attraction will be the prevailing power; and if the two magnets have freedom of motion they will approach till they meet, and will adhere to each other: on the other hand, if the pole *b* were turned towards the pole B, as represented in figure 2, from the same mode of reasoning, with a simple inversion of the terms, it is obvious there will be repulsion between the two magnets. This will be the case also if we suppose these magnets to turn towards each other their poles, A, *a*, solicited by the austral fluid. In general, two magnets attract each other by their poles of different names, and repel each other by their poles of the same name.

21. Let us conceive the body N (fig. 1) a bar of iron, that, while in the natural state, finds itself so placed within the sphere of action of the magnet M, that that magnet turns its boreal pole, B, towards it. The force B′ of that magnet, equal to the surplus force of B over A, will act so as to decompose the fluid of N; and it is manifest, that the effect of this action will be to attract towards *a* the austral fluid disengaged from the combination, and to repel towards *b* the boreal fluid: in other words, the bar N will acquire itself the magnetic virtue, so that the nearest poles will be those of different names, and the two magnets will attract each other. The result will be the same, if we suppose the bar of iron to be presented to the magnet M on the opposite side, so that the magnet might turn its austral pole, A, towards it. Hence we infer, that when a bar, or any piece of iron in its natural state, is presented to a magnet, the action of the magnet communicates a magnetism contrary to that of the pole to which the bar was nearest, so that, in this case, there is always attraction between the two bodies. The naturalist here also merely avails himself of the magnetic fluid to repeat an electrical experiment; as that, for instance, in which a body, being in a certain state of electricity, first makes another body quit its natural state, and then attracts it to itself.

22. The bar which has received the magnetic virtue, acts in its turn on the magnet that has communicated it, by decomposing a new portion of the natural fluid of that magnet, of which one part is attracted towards the pole nearest to the bar, and the other to the opposite pole. The same thing happens, for a stronger reason, when the magnetism is communicated to a bar by the immediate contact of another bar already magnetised. And hence a sort of paradox extremely embarrassing to those who admit of the principle of vortices or of magnetic effluvia, which is, that a magnet should become stronger when it would appear to have ceded a portion of the fluid in which its strength consisted. Meanwhile, this increase of virtue acquired by the magnet is perceptible only inasmuch as the coercive force of the magnet is very inconsiderable.

23. Reaumur was the first who observed, with surprise, that a magnet, which had scarcely the

necessary power to sustain a piece of iron of a given weight, raised it more easily when the iron was placed on an anvil. In the theory we have adopted, this effect explains itself. The iron cannot be in contact with the magnet without becoming itself a magnet. Accordingly it so acts, in its turn, as to magnetise the anvil, and the anvil again reacts upon it to augment the quantity of free fluid in each of its poles, that is to say, it renders it more susceptible of attraction than it would have been without it.

24. Let us resume the hypothesis in which the body N (fig. 1, pl. 101) having passed from the natural state to that of magnetism, by the action of the body M, the respective positions of the poles were those which the figure represents. Suppose further, to give to the experiment a more favourable light, the two bodies to be in contact at their poles, B, *a*. If we place behind the body N, at the point *b*, a third body, in the natural state, the action of N will convert that body, in its turn, into a magnet of which the austral pole will be contiguous to the pole *b*; and this series may be continued to any length. There is a curious mode of varying this experiment, by presenting one of the poles of a small magnetic bar to one of the extremities of a sewing needle, and then to take up the bar so that the needle may remain suspended to it: the extremity of this needle will serve as a bait to attract a second needle, which will continue in like manner to be suspended to the first, and thus needle may be appended to needle as long as the magnetic force is sufficient to overcome the weight which tends by its action to break the chain.

25. There is another result, which, elementary as it may be at present, to those who understand but little of the theory of the magnet, exhibits so convincing a proof of that theory, that, for this circumstance alone, it deserves to be cited. Take two magnetic bars of nearly equal force, and present to each of them in turn a key which it is capable of raising, which it will do whatever be the pole that is placed in contact with the key. Then place one of the bars on a table so that one of its extremities may extend sufficiently for the key to remain suspended to it. Then put the other bar upon that to which the key is pendent, making the poles of different names correspond on the same side; and the key instantly falls, because the action which the pole in contact with it exerts to attract to itself the heterogeneous fluid of the key is nearly destroyed by the repulsive action of the second bar. Hence we see, that to explain the fact this principle is necessary, that iron placed in contact with a magnet becomes itself a magnet. We see, too, the ground of the surprise which this effect produces, when the mind is not sufficiently on its guard against the paradox that presents itself to the eye, which is, that a force is destroyed by the addition of another force, which, acting alone, produces in appearance an effect entirely similar.

26. The action of magnetism transmits itself freely through all bodies not susceptible of acquiring it. Place for instance a board, a pane of glass, a plate of copper, &c. between two magnets, and there will be no apparent alteration in their reciprocal actions. Charlatanism availed itself of this quality, possessed by magnetic forces of not being impeded by any obstacle, to give to the most ordinary phenomena an air of magic, by means of machinery, that concealed from the spectator the real agent.

But here even experience, free from all idea of disguise, leads to results, formed apparently to disconcert the sagacity of the philosopher himself: but a theory is never better established than when its principles, which at first were supposed to be shaken by the difficulties arising from those very results, derive, on the contrary, new strength from the happy solutions they furnished of them. We have already had occasion to cite several such solutions, and what we are about to offer will exhibit other instances equally remarkable.

27. Place vertically, at the distance of a few centimetres from each other, two bars of magnetised iron, with their contrary poles turned to the same side; then cover the upper extremities with a thin board or piece of paper strewed with iron filings, and these filings will so arrange themselves as to form a multitude of curves of greater or less width, which all cross one another in points situated immediately above the upper extremities of the two magnets. Figure 62 is a kind of representation of this assemblage of curves.

Philosophers have considered this phenomenon as an evident demonstration of the action of magnetic vortices. Other experiments furnish only matter of conjecture as to their existence; but here do we not see them actually exhibit themselves?

We shall analyse this phenomenon, that we may the better understand its true interpretation, agreeably to the principles of our theory. Let C G (fig. 3, pl. 101), be a magnet having its centre of boreal action in B, and its centre of austral action in A. Conceive a ferruginous needle, extremely short, to be suspended freely at a point, N, nearer to B than to A. This needle, which we have hitherto supposed to be in the natural state, will itself become a magnet; and as we may then consider the magnet C G as solicited by a single force, the needle, by virtue of a certain quantity, B′, of boreal fluid, will assume an oblique position to the magnet, so that *a* will be its austral pole, and *b* its boreal pole. In this state of things, suppose the centre, *c*, of the needle to be moved a little along the line *a d*, or the line of prolongation of the needle, so that its centre, for example, shall be in *g*. In consequence of this single movement, the extremity, *a*, of the needle will approach towards the point B: from which it follows that the needle will assume a new position less oblique than the preceding, and directed according to the line *e m*, which will make with the line *b d* an infinitely small angle. If we give to the centre, *c*, a further movement along the line *e m*, so that this centre shall be in *f*, the needle will take another direction, such as *f l*, making a very slight inclination with the preceding direction. If we continue to move the centre of the needle in the same manner, it is obvious that this centre will describe a curve *c g f n*, &c. the sides of which will coincide with the different directions of the needle.

In this curve there will be a point where the needle, which continually departs from the parallelism with C G, will take a direction *n r*, perpendicular to that line. Beyond that point, the extremity of the needle still tending to approach nearer and nearer to the point B, the new sides, *r s*, of the curve will be inclined in a contrary

way to the first sides, *e g*, *g f*, &c. and at last, when the extremity, *a*, of the needle shall be indefinitely near to the point B, the curve will pass through that point. Below, it will form sides, which will approach continually nearer to parallelism with C G; and when the centre of the needle shall be at *p*, situated directly under the centre O of the magnet C G, the direction, *x y*, of the needle will be parallel to C G, because of the equilibrium between the forces of the poles B and A. Beyond that term, the force of the pole A being the preponderating force, the curve will incline towards A, and at last will pass there, forming a new branch, *x z* A M, of the curve, similar to the opposite one.

Let us now imagine the centres of a multitude of extremely short needles to be arranged on the circumference of this curve: these needles will shortly assume such positions, that each of them will direct itself according to the tangent at the point of the curve, which will be confounded with the centre of the needle; and as all the needles are directed towards each other by their poles of different names, they will adhere to one another, and will form a continued curve.

If particles of filings be substituted for these needles, and instead of supposing these particles freely suspended, we conceive them to be laid on a plane where they experience a degree of friction, the resistance produced by the friction will prevent them from gliding towards the points A, B, which act to attract them; at the same time this attractive force may be such, that the filings will take the direction which they would have had, if placed so as to have been moveable round their centres, especially if we second their tendency, by slightly shaking the plane that supports them, so that they will form on that plane by their junction the curved line we have mentioned. We may comprehend without difficulty, that if the plane is covered with particles of filings, the particles will take a direction to the sides of different curved lines adapted to the corresponding systems of individual action, and the curves will have two common intersections at the points A and B, which is conformable to observation.

28. We may explain with the same case a little phenomenon bearing some affinity with the preceding one, and which is the more curious, as it would seem, by its singularity, to make experience contradict theory. It is this: Place on a piece of board, or a table, O R (fig. 4), a slender iron wire, two or three millimetres in length, and hold above the table, at the distance of a few centimetres, a magnetic bar, A B, in a vertical position, having its lower extremity, which may be either the boreal or the austral pole, sideways as to the wire. The wire instantly raises it at the extremity nearest the bar, taking an oblique position such as *b a*. Shake the table slightly so as to jolt the wire a little, and you will see it regularly approach towards the bar, till it places itself in a vertical situation immediately under the pole B.

Thus far there is nothing which the observer might not have foreseen. But place the bar underneath the table, as is represented in figure 5, and proceed with the experiment as before, and the wire *b a* will raise itself again, making an angle more or less acute with the surface of the table; but in proportion as we slightly shake the table, the needle will continually remove from the bar, approaching the point R, though it is evident that the bar exerts on it an attractive force.

To solve this paradox, let us take the case in which the bar was above the table. Let B (fig. 6) be the inferior centre of action of this bar. At the moment the wire rises, we may consider it as a small lever, *a b*, the fulcrum of which is at the point *b*, and the extremity *a* is solicited at once by the attraction of the pole B, and by the weight which acts to make it descend. Now this last force opposes itself in part to the effect of the attraction of the pole B, so that the angle *a b s*, formed by the direction of the wire with the plane O R, is less than the angle B *b s*, which would have been formed on the supposition of the wire directing itself according to the line *b* B, which passes through the pole of the bar.

Now let us suppose the wire *a b*, in consequence of some force, to be detached from the plane O R, so that its centre of gravity, *c*, shall be a little above its first position, for instance at the point *c'* in the vertical line *u c z*: if we suppose, for an instant, it has taken the position *a' b'*, parallel to *a b*, it will not preserve it; but its extremities, *b'*, *a'*, having both in that case freedom of motion, the wire will turn round the point *c*, and will tend to direct itself on a line passing through the pole B, which cannot take place without its extremity *b'* lowering itself towards the plane O R; and when it shall touch it, the wire having a direction such as *b'' a''*, of which the prolongation passes through the pole B, or nearly so, its extremity *b''* will be nearer the vertical line *s* B, than when it had the position *b a*. At the same time, the resistance of the plane O R offering a new fulcrum to the small lever which rests on it by its extremity *b''*, this extremity will remain fixed, while the opposite extremity *a''* will descend a little from the effect of gravity, so that the angle *a'' b'' s* will diminish by a small quantity, continuing however always larger than the first angle *a b s*.

During the descent of the point *a''*, the centre of gravity *c'* will quit the vertical line *u z*, and place itself in the point *x*, on an arch of which *b'' c'* will be the radius, and accordingly it will approach nearer to *s* B. If we shake the plane O R a second time, and imagine a new vertical line, passing through the point *x* and along which the centre of gravity of the wire moves, the same effect will be repeated; and this will be the case every time, so that the point *b''* will have a progressive motion towards the point *s*, and will at last coincide with it, by directing itself according to the vertical line *s* B.

The supposition we have made of a vertical line, of which the centre of gravity of the wire follows the direction, by raising itself above its preceding position, is not very remote from the truth; for the distances of the poles *a*, *b*, of the wire from the pole B of the magnet, differing but little from one another, on account of the shortness of the wire, the two actions of the pole B, of which one attracts the pole *a*, and the other repels the pole *b*, are nearly equal; and as the shaking of the plane is supposed to act in a direction diametrically opposite to that of the weight, it follows, that the centre of gravity of the wire remains, as to sense, in the same vertical line, both while the wire ascends and while it descends.

The experiment ought to exhibit effects the reverse of these, when the magnet is placed underneath the plane O R, as in figure 7, where we

suppose the pole A, the nearest to the plane O R, was the austral pole, which is immaterial as to the result. In this hypothesis, the wire having taken of itself the direction $b\ a$, if we give a slight shaking to the plane O R, and c' be the new position of the centre of gravity of the wire, it is easy to perceive, that this wire, instead of remaining in a direction, $a'\ b'$, parallel to $a\ b$, will lower itself by its extremity b', in such manner that when it shall touch the plane O R, the direction of the wire will be in the line $a''\ b'$, A, which passes through the pole A of the magnet: whence it follows, that the extremity b'' will be farther from the vertical line A s, than in its first position. But at the same moment the wire, supported at the point b'' by the plane, will descend by its extremity a'', in consequence of the weight, and its centre of gravity will be transferred to the right of the vertical line $u\ z$; from which it is easy to conceive how the new shocks given to the plane O R will determine it to approach the point R, so that the attraction exerted on it by the magnet will appear to be changed into repulsion.

29. We shall state another very easy experiment, which furnishes a numerous assemblage of little phenomena, similar to the one we have just explained. Instead of a single iron wire, put on the board O R a pinch of filings, and so place the magnet underneath the board, that its direction if continued would pass through the centre of the part strewed with the filings. In proportion as you agitate the board by slight concussions, you will see the particles of filings disperse themselves on all sides as if they were moved upon the radii of a circle, leaving void the spot they first occupied, and ranging themselves round it in the form of a disc.

30. Before we proceed farther, it will be necessary to give an idea of the manner in which the two magnetic fluids are distributed in the interior parts of a magnet. This distribution, which is analogous to that of the electric fluid round a conductor, or of the two electric fluids in a tourmalin, is in general so arranged, that the magnetic densities being very considerable near the extremities, decrease rapidly from thence, and become almost nugatory in a very manifest space situated towards the middle of the magnet. It follows, that the centres of action of these bodies are, as we have stated (16), at a short distance from their extremities. For example, in a steel wire 67·5 cent. or 25 inches long, this distance was but 22·5 mill. or ten lines. We may form a pretty accurate judgment of this proximity of the centres of action with regard to the extremities of a magnetic steel wire or bar, by holding such a bar in a vertical position opposite the freely suspended needle of a compass, and by raising and lowering it, so that the different points in its length may be successively presented to the needle: in this case we shall observe in the needle a manifest tendency to a certain point of the bar, which will be little remote from the extremity situated on the same side.

This distribution of the two fluids in a magnet depends on the principle that the forces of these fluids conform to the inverse ratio of the square of the distance. To judge from appearances, the action of each moiety of a magnet proceeds wholly from the presence of a single fluid in a state of freedom. But every thing induces us to admit the happy hypothesis of Coulomb. It consists in regarding every molecule of iron as a small magnet, that has its boreal pole and its austral pole equal in force to each other. All the petty magnets of which a magnetic bar is the assemblage, are ranged in different files parallel to the axis of the bar, in such manner that the boreal pole of one is contiguous to the austral pole of the next, or reciprocally. We shall attempt to shew how this hypothesis furnishes an equivalent to what would take place if each moiety of the magnet were in a single state of magnetism.

31. Conceive, in the first place, an indefinitely thin needle, $m\ n$ (fig. 8), composed of an infinite number of small partial needles, c, d, e, f, &c. and suppose this needle to have been put into a state of magnetism by the action of a magnet. In this case, all the contrary forces of the contiguous poles b, a'; b', a'', &c. * will be equal to one another, so that their actions will be reduced to zero. As to the forces of the two extreme poles, videlicet, that of the pole a of the needle c, and that of the pole b of the needle r, which alone are in action, on account of their distance, the quantities of fluid on which they depend residing only in two points, these forces are supposed to act on all the intermediate poles at infinite distances, and their action is of consequence inefficient to alter the state of the whole needle. Hence, if there existed a magnetic needle similar to this its two centres of action would be in the extreme points, and all the space between would be supposed to be in the natural state.

But the hypothesis of a needle infinitely thin is merely ideal, and all magnets have necessarily a thickness more or less apparent. Yet we may discover, by a train of reasoning, what ought to be the result of the reciprocal influence of different needles resembling the needle $m\ n$, of which a magnet is supposed to be the assemblage, to place that magnet in the state in which the experiment presents it to us.

Let us imagine that M N being the magnet in question, the distribution of the two fluids is at first the same in each of its component needles, as that which takes place in the needle $m\ n$; let us suppose, further, this needle to be placed in contact with the magnet M N, so as to become one with it, and let us examine the action which it ought to exert on the different points of the needle. If we divide in imagination the magnet M N into as many parts, C, D, E, F, &c., as there are constituent needles in the needle $m\ n$, we shall have a series of magnets in which the forces of the contiguous poles B, A′; B′, A″, &c. will mutually destroy one another; and thus M N, in the present supposition, will not be able to act on the needle $m\ n$ but by means of forces which have their seat in the extreme poles; such are the pole A of the part C, and the pole B of the part R. Now, each of these forces is that of a fluid which extends over a surface equal to the base of the part C or R, composed of an infinitude of points; from which it follows, that it acts at finite distances on all the little needles, c, d, e, f, &c.

Now the fluid of the superior pole A attracts to itself the boreal fluid of the pole b, b', b'', &c. of each of these needles, and repels the austral fluid of the pole a, a', a'', &c. There will then be a certain number of heterogeneous molecule that will re-unite themselves in every needle, and

* The letter b indicates here, as before, the boreal pole, and the letter a the austral pole.

compose anew a portion of the natural fluid. But the fluid of the pole A acts more forcibly on the needles near the extremity m, and more feebly on those which are at a certain distance from its extremity. The quantity of natural fluid composed anew will therefore decrease from one needle to the other; and by a necessary consequence, the portions of fluid which remain in a disengaged state, will, on the contrary, go on increasing from the extremity m. The same effects will take place in the contrary way, by virtue of the action of the inferior pole B on the needles r, o, h, &c.

It follows from what has been said, that if we represent by a, b, a', b', &c. the quantities of fluid which remain in a disengaged state in the needles of which these letters have served to designate the poles, and if we compare the two needles c, d, we shall have a' greater than b; in like manner by comparing c with d, we shall have a'' greater than b', &c.; from which we conclude, that the action $a'—b$ of the first two poles, as well as the action $a''—b'$ of the two next, is equivalent to that of a single austral pole animated by a force equal to the excess of a' above b, or of a'' above b'. By employing the same mode of reasoning with regard to all the following poles till we come to the middle of the needle $m\,n$, we shall infer that all this half is in the same case as if it were solicited by a series of decreasing quantities of austral fluid. With respect to the inferior half of the needle $m\,n$, the reverse will be the fact. The differences, $b'—a$, $b''—a'$, &c. between the quantities of fluid belonging to the constituent needles r, o, &c. will each represent a boreal force, and all this second half of the needle will be considered as in a state of boreal magnetism. Moreover, the points equally distant from the extremities being solicited by equal and contrary forces, we shall have, in the middle of the needle, $b'''—a'''=O$; whence it follows, that that point will be neutralised.

But as the forces of the magnet M N follow the inverse ratio of the square of the distance, they will act on the needles near the extremities with an intenseness incomparably greater than on those at a certain distance from these extremities; so that if the needle $m\,n$ be rather long, the effect of these forces on the middle part of the needle will be almost nugatory. Accordingly the fluids will preserve in this part nearly their primitive state; and that state, as follows by consequence, will differ but little from the natural state.

What we have said of the indefinitely thin needle, $m\,n$, may be equally applied to all the needles of which a magnet, M N, having a manifest thickness, is the assemblage, and that by virtue of the reciprocal actions of those needles; so that at the very instant in which this needle has been drawn from the natural state, there is established in its interior a general distribution of the two fluids, similar to that which, to aid our conceptions, we have supposed relatively to a single needle.

32. It is now easy to solve the difficulty presented by a phenomenon, that has excited in no small degree the astonishment of naturalists, and of which Æpinus himself gives but a very unsatisfactory account. Cut a magnetic bar towards one of its extremities, so as to detach a portion of it, that may be ever so short, and instantly that portion becomes itself a complete magnet, having also its two halves solicited by equal and contrary forces. How, by the ordinary theories is it conceivable, that this segment, which was before completely in a unique state, like the part from which it was separated, should all at once, by a sort of creation, be furnished with a double magnetism?

To unriddle this seeming paradox, let us again have recourse to the supposition of the indefinitely thin needle, $m\,n$, which presents, as we have seen, a succession of opposite poles, equal in forces, and contiguous two and two, except the first and last, which are apart. If we were to break this needle, at any point whatever of its length, it is evident, that each part would have still at its extremities two poles animated by equal and contrary forces, of which the one, which was at first remote, had then all its energy, and the other, which was balanced by the force of the contiguous pole, would be placed in activity, on separating itself from that pole.

The same thing will have place, if we suppose a portion of the magnet M N has been detached from its length; with this difference, that the pole situated at the place of division will at first have more force than that of the opposite extremity; since in the magnet, when entire, the quantities of the fluid went on increasing from one pole to the other, from each extremity. But at the very instant, the state of the whole system will change so as to complete the conditions of the equilibrium, which requires that every thing should be the same in both parts, at equal distance from the extremities.

33. We have seen that tourmalins present a similar phenomenon; and in reality it is natural to suppose, as the component moleculæ of bodies, whether magnetic or electrical, are little complete crystals, similar in form, and disposed symmetrically in the whole body, that each molecule must completely undergo the double action of electricity or of magnetism, to place its two halves in different states: and accordingly the distinction between these states, as to entire bodies, is only a consequence of what takes place relatively to each molecule. The effect of the whole assimilates itself to that of the component parts; and thus, on this hypothesis, which is extremely plausible, there is no longer any thing extraordinary in the phenomena produced by those bodies, which may be termed the *polypi of the mineral kingdom*.

3. *Communication of Magnetism.*

34. We have already spoken (21) of the action exerted by a magnet on a piece of iron which, being first in the natural state, was afterwards placed within the sphere of activity of that magnet; and we have seen that it acquired itself the magnetic virtue, so that its part turned towards the magnet was in an opposite state to that of the pole which had acted on it at a nearer distance. We have now to explain the different means which have been devised to carry to the highest possible pitch the magnetism acquired by communication. But we must first give an idea of a result that has sometimes taken place, in consequence of an irregular distribution of the two fluids put in motion in a body passing to the state of magnetism.

35. Suppose A B (fig. 9) to be a powerful magnet which acts on a bar of iron, $m\,n$, to communicate to it the magnetic virtue: the action of this magnet, which will depend on the excess B' of the force of the boreal pole B over that of the austral pole A (551), will attract the austral

fluid a in the parts of the bar near n, and repel the boreal fluid b in the parts situated towards m. Now there are two circumstances that occasion in the motion of this last fluid some obstacle: first, the difficulty which its moleculæ experience in moving the iron, which proceeds from the coercive force, and next the repulsion exerted on these moleculæ by those of the fluid already accumulated towards the extremity m; a repulsion that augments continually, in proportion as the accumulation itself continues to augment. Accordingly there may be a term where the resistance arising from the concourse of the two causes may become superior to the repulsive power of the force B′, and the fluid will then, if we may so speak, be choked up in some point, b', by yielding to that resistance, and may even so abound there, that its action shall produce in the neighbouring part a' austral magnetism.

The bar of iron, $m\,n$, will therefore, in that case, have four poles in succession to one another, and possessing alternately austral magnetism and boreal magnetism. To these different poles succeeding one another in the same magnet, the name of *consequent points* has been given. There is however a great difference between this succession of contrary poles and that which results from the moleculæ of iron being so many minute magnets of which the poles in contact have opposite forces; for we have seen that these forces are equivalent to a single force, which does not vary in different points except by its intensity, whereas every consequent point determines a force really contrary to that which the part in which it resides would manifest without it.

36. To render more intelligible what we have to add upon this subject, we shall resume here, with more detail, what has been said (11) of the difference which the greater or less degree of hardness of the iron occasions, in general, in the internal motion of the fluid. Steel does not accommodate itself to this motion without great difficulty; but the two component fluids having once overcome the obstacles which prevented them from distributing themselves in the two halves of a steel bar, the same difficulty which had retarded this distribution opposes itself to the effect of the attractive force, which tends to bring back the two fluids to one another, and by their combination restore the bar to its natural state. On the contrary, in soft iron, the disengagement of the two fluids is effected more easily and more abundantly; but the return to the state of combination takes place afterwards with the same ease; from whence it follows, that soft iron readily acquires a considerable degree of magnetism, but which is at the same time fugitive; while steel, magnetised with much greater difficulty, preserves its virtue longer; and it is for this reason that steel alone is used for making artificial magnets.

37. The most simple way of communicating magnetism to a steel or iron rod, is to rub this rod with a magnetised bar, gliding one of the poles of the bar along the rod through its whole length, and repeating several times this operation in the same direction. Suppose the pole in contact with the rod to be the boreal pole of the bar: the action of that pole attracts the austral fluid of the rod, and repels the boreal fluid; whence it results, that the part of the rod in contact with the bar, tends incessantly to the austral state of magnetism, and when the bar reaches the extremity, and is then taken away, the part it has quitted is in that same state of magnetism.

38. During its motion the bar acted at the same time on each part, at a certain distance, to repel the boreal fluid; but in proportion as it advanced towards the extremity where its motion was to end, it destroyed the effect of that action in the points it approached, and made them pass to the austral state of magnetism; whence it follows, that at the termination of its motion, the parts situated within a certain limit of the extremity which it came to quit possess austral magnetism, and the ulterior parts, situated towards the opposite extremity, have acquired boreal magnetism; and accordingly, when the rod shall afterwards be left to itself, the two fluids, to answer to the conditions of equilibrium, will be distributed in such a manner that all that half over which the bar last passed, will possess austral magnetism, and the other half boreal magnetism.

39. If a new friction be given in the same direction as before, it will partly diminish the effect of the preceding, and partly increase it; and so long as the second effect shall prevail over the first, the rod will continue to acquire magnetism. But this augmentation of the magnetic virtue will be so extremely limited, that after a few strokes the communication of magnetism will cease.

40. The method of double contact, invented by Mitchell, is much more advantageous. It is this: Take two magnetic bars, R, S, (fig. 10), and raise them vertically at a short distance from each other, so that their opposite poles, A, B, may correspond. In this situation make them glide from one end to the other, backwards and forwards alternately, along the rod, B′ A, that is to be magnetised, taking care that they never pass beyond either extremity of the rod. After a few strokes, when the bars are near the middle of the rod, take them away in their perpendicular direction to the rod. The result of this operation, is to place each extremity of the rod in the contrary state to that of the inferior pole of the bar, situated towards that extremity.

41. To understand the effect of this method, let us consider first, what passes in the part of the rod answering to the interval between the centres of action a' and b' of the inferior poles, the only ones which have any very perceptible influence on the result. It is easy to perceive, that each molecule of the austral fluid, such as x, comprehended in that intermediate part, is attracted from left to right by the boreal centre of action b', and repelled in the same direction, by the austral centre of action a'. On the contrary, each molecule, m, of the boreal fluid is attracted from right to left, by the centre a', and repelled in the same direction by the centre b'. These effects are contrary, as far as a certain point, from the influence which the bars exert on the ulterior parts; for example, the bar S repels towards the right the moleculæ, y, of the boreal fluid which are behind it, while it repels from right to left those which are before, in the interval between the centres. But the first repulsion is in a great measure destroyed by the contrary attraction of the other bar R, on the same moleculæ; so that every thing being counter-balanced, the operation goes on incessantly towards its object, which is, in general, to produce austral magnetism in the half of the rod situated to the right, and boreal magnetism in the opposite half. The precaution that is observed at the end of the opera-

tion, of taking away the bars when at the middle of the rod, tends to favour the symmetrical distribution of the fluids in the two halves of the rod when left to itself.

42. A consideration presents itself here relative to the distance requisite between the bars, that their actions may have the greatest possible influence on the principal effect, that is to say, on that which is produced in the space intercepted between those bars. The determination of this distance depends upon the height of the centres of action, a', b', above the bar, A′, B′, which receives the magnetic virtue. To understand this, suppose that the bars, being at a distance from each other, have their centres of action in $a\ b$ (fig. 11), and that A′ B′ be still the body that was to be magnetised. For the greater simplicity, let us confine our attention to the repulsive action of the centre b on a particle, m, of the boreal fluid contained in the bar A′ B′. This action being directed obliquely, with respect to the length of the bar, which is the direction in which the fluid must be impelled to arrive at B′, it decomposes itself into two other actions: one, answering to $b\ p$, perpendicular to A′ B′, is nugatory as to the proposed effect; the other corresponding with $b\ r$, drawn parallel to A′ B′ till it meets $m\ r$, perpendicular to the line joining the two centres; and this second force alone contributes to the motion of the particle towards B′.

Now, on the one hand, the line $b\ r$ increases in proportion as the angle $b\ m\ a$ is less acute, or, which is the same thing, in proportion as the two bars are farther from each other; but at the same time, the intensity of the action of b diminishes, by reason of the greater distance between that centre and the molecule m. Suppose this distance to be nothing, the action represented by $b\ r$ will vanish; on the contrary, suppose it infinite, the intensity of the force b will become zero in its turn. There is therefore, with respect to the angle $b\ m\ a$, a certain mean measure, giving for the real force the greatest possible value. Æpinus, who supposed that the action of the magnetic forces followed the inverse ratio of the simple distance, found that the angle $b\ m\ a$, in the case of a *maximum*, was a right angle; but if the real law be established, that is, the law which follows the inverse ratio of the square of the distance, we shall have 70° 31′ 44″ for the measure of the angle in question.

Suppose, for example, that the bars employed in this experiment were in the same state as the steel wire of which we have before spoken (30), which was 67·5 centimetres in length, having the centres of action 22·5 millimetres from the extremities; to obtain the *maximum* of action, the bars must be placed at the respective distance of 32 millimetres.

43. Æpinus, in the method of double contact, has followed a different process, by inclining the bars in a contrary way, as is represented in fig. 12, so that each shall make a small angle of about 15 or 20 degrees with the bar A′ B′. By this mode of operating, he supposes two things to be obtained: first, that the centres of action, a', b', which were raised to a certain height above the surface of the bar A′ B′, when the bars which acted upon it were in a vertical position, are in the present case much nearer to it, and their action becomes in consequence much more efficacious. Secondly, the interval between the centres of action being greatly augmented in consequence of the very obtuse angle which the bars make with each other, this new circumstance widens the limits between which the effect of the conspiring forces was compressed, and proportionally favours the activity of those forces.*

But these advantages were in a great measure balanced by the inconvenience which attended the operation, or frequently producing in the bar A′ B′ consequent points, whose action, though slight to the senses, was not to be neglected; especially when the needles of mariners' compasses were in question, their perfection partly depending on their poles. To comprehend this inconvenience, let us suppose that the bars A B in moving from A′ to B′ are at the middle of the bar A′ B′. Let $r\ z$ be a perpendicular let fall from the centre of action of A on this last bar, A molecule, s, of the boreal fluid situated to the right to this perpendicular is strongly solicited to approach it, by virtue of the action of the two bars A B; but at the same time a molecule, s', of the same fluid situated to the left of the same perpendicular is attracted in an opposite direction, and this action is no longer sensibly destroyed by the contrary force of the centre b', as in the case where the bars A B are situated vertically. Now it may happen that the fluid, s, s', shall be so accumulated in the space it occupies, that when the motion of the two bars shall afterwards be continued, the coercive force of the bar A′ B′ shall permit them only to repel back again towards B′ a part of the same fluid. There will consequently be formed in the space $s\ s'$ a boreal pole, which in its turn will give rise to an austral pole in the next space situated towards B′, and thus will introduce into that space a kind of perturbating force in regard to that of the extremity B′.

To remedy this inconvenience, Coulomb, having placed the two bars A B on the middle of the bar A′ B′, inclining them as Æpinus did, draws them in contrary directions to each other, till at a small distance from their respective extremities, and then begins the friction anew, always proceeding from the middle. By this method the forces of the centres, a' b', being more divided, without ceasing to be conspiring forces, no longer produce those accumulations of fluid whence consequent points result.

44. To obtain two bars strongly magnetised, four are taken all equal and similar to each other, of which two at least should have a commencement of magnetism. The first two are placed parallel to each other, as M, N, (fig. 13), and against their extremities two parallelopipeds,

* The method of double touch, or double contact, was first published by Mr. Canton, who availed himself of the ingenious experiments of Mr. Mitchell of Cambridge, to whom the discovery is justly ascribed by Haüy. The method here attributed to Æpinus, is due to Antheaume, and was described in his memoir *sur les Aimans artificiels*, 1766. According to Professor Robison, the great advantage of this method is the regularity of the magnetism which it produces. We never find more than two poles; and when the bars are hard and of uniform texture, the polarity is very little diffused, and seemingly confined to quite a minute space at the very extremities of the bar; which is a prodigious advantage in point of strength. This method too, appears the only one, by which two bars can be impregnated joined end to end, considering them as one bar.

T, T, of soft iron are applied, the whole forming a rectangular figure. The two bars, R, S, which are already in a magnetic state, are then used, to communicate the same virtue to one of the first bars, as M for example, following the method of Æpinus, or, if it be preferred, that of Coulomb. This bar acquires poles, the positions of which are indicated by the figure, and already the other bar N, by virtue of the communication that is established between it and the bar M, by the intermediation of contacts, receives itself a commencement of magnetism; and it is easy to conceive, that each of its poles corresponds to the contrary pole of the bar M, as may also be seen by the figure. After a certain number of strokes, the bar M is turned, without changing the disposition of its poles, and the operation is repeated on the other surface. Similar frictions are successively given to the two surfaces of the bar N, taking care to reverse the positions of the poles of the bars R, S, because those of the bar N are themselves situated in a contrary direction to the poles of the bar M. This done, the bars R, S, are substituted for the bars M, N, and the last are used to augment the virtue of the others. When the communication of magnetism is supposed to have attained its greatest extent, those bars which were last subjected to friction are preferred, to magnetise steel needles, and other bodies of the same nature.

The effect of this operation is favoured by making the other two bars concur as auxiliary means in producing it. In that case, those bars are directed on one and the same line, as represented in fig. 14, at a less distance than the length of the needle that is to be magnetised, and the needle has given to it the position *a b*, answering to the interval between the two bars, so as to rest upon them by its extremities.

If the bars M, N, (fig. 13), had already a certain degree of magnetism, it is evident that they ought previously to be placed in their respective positions analogous to those which the figure represents, where the poles of different names correspond on the same side.

45. Suppose that the bars M, N, were in some way or other to be kept in an invariable position, relatively to themselves and to one of the contacts T, and that, having suspended this apparatus vertically, so that the point at which it is held may be on the side of the fixed contact, there were to be placed on the side of the other contact a piece of soft iron with a hook below it, like that represented underneath the magnet P S (fig. 15.). By suspending different bodies to this hook, we shall be able to ascertain the weight the magnet is capable of bearing by virtue of its attractive force. It is upon this principle that artificial magnets are constructed; all the difference is, that for the bars M, N, two bundles of thin steel laminæ are substituted, which, having before been magnetised separately, are then so united, that they might in each bundle be contiguous by the poles of the same name. Coulomb has formed magnets of this kind that weighed about ten kilogrammes, or twenty pounds, and of which the power was equivalent to a weight of about fifty kilogrammes, or a hundred pounds. In small magnets the proportion between the weight of the apparatus and that of the charge is greater. Ingenhousz cites an instance of one of these small magnets that supported more than a hundred times its own weight, and adds, that Dr. Knight told him the weight might have been extended much farther.*

46. The name of armour is given to the plates of soft iron applied to natural magnets at the places of the poles, and that contribute either to preserve their virtue, or even to increase it. Previously to arming a magnet, it is shaped like the rectangular parallelopiped P S (fig. 15.): so that if we conceive a plane passing at equal distance from the two opposite surfaces, and parallel to those surfaces, the two halves intercepted by this plane will be in two different states of magnetism, like those of a magnetised bar. Each armour, *f h* or *f' h'*, has the form of a carpenter's square, of which one of the branches, *f f'*, which is longer than the other, and is called the *leg* of the armour, is applied to one of the surfaces we have mentioned; and the other branch, *h h'*, which is the *foot* of the armour, is applied to the adjoining surface, which may be considered as the base of the parallelopiped. Of this base the armour covers only a space a few millimetres in length.

Let us now analyse the effect of the armour which answers, for example, to the pole B of the magnet. The force of this pole acts so as to decompose the natural fluid of the armour; it attracts the austral fluid in the parts of the substance of the armour nearest the loadstone, and repels the boreal fluid in the parts most remote; and as it acts much more efficaciously on the leg *f*, the austral fluid will in preference pour itself into the substance of that leg, and the boreal fluid will be driven back in great measure into the foot *h*, as much by the action of the magnet, as by the mutual repulsive force of its own moleculæ.

The foot of the armour will accordingly acquire the kind of magnetism which exists in the corresponding part of the magnet, that is to say, boreal magnetism. By a similar mode of reasoning we may prove, that contrary effects take place with regard to the other armour.

Now the leg acts in its turn, by an austral magnetism, on the boreal pole of the magnet, to attract there a new fluid; an effect that is but weakly balanced by the opposite action of the foot of the armour, which is at a greater dis-

* Among artificial magnets, those which are bent into a form resembling a horse-shoe, so that the two ends nearly meet, and therefore called *horse-shoe magnets*, are reckoned comparatively very powerful. To render such a shaped piece magnetic, place a pair of magnetised bars against the ends of the horse-shoe, with the south end of the bar against that of the horse-shoe which is intended to be the north, and the north end of the bar to that which is to be the south; the lifter, of soft iron, to be placed at the other end of the bars. Also rub the surfaces of the horse-shoe with the pair of bars disposed like the legs of compasses when a little open, or with another horse-shoe magnet, turning the poles properly to those of the proposed magnet; and being careful that these bars never touch the ends of the straight bars. To prevent a sudden separation of the bars from the horse-shoe, which would considerably diminish the force of the latter, slide on the lifter, or support, to the end of the horse-shoe magnet, but in such a manner that it may not touch the bars; they may then be taken away, and the support slid to its place.

tance. By a necessary consequence the foot will acquire an increase of force; and it is, in general, to this combination of reciprocal actions that the advantage is to be ascribed which the armour possesses of giving new activity to the force that loadstones have received from nature.

The leg of the armour ought to be of such a degree of thickness, that it might neither be diminished nor increased without inconvenience; for if it be so thin, that the adjacent pole of the magnet would be capable of attracting to it a new quantity of fluid, as in the case of its being thicker, it would not produce its whole effect. On the other hand, if its thickness greatly exceeded the limit to which the fluid attracted by the nearest pole might extend itself, the other fluid repelled by the same pole, passing in part into the remainder of the thickness, would produce there a magnetism similar to that of the same pole, and of which the reaction on that pole would oppose itself to the principal effect. There is therefore, a certain degree of thickness that gives, relatively to the leg of the armour, the maximum of magnetism, contrary in kind to that of the adjacent pole, and relatively to the foot the maximum of magnetism similar to that of the same pole. The artist who would direct the construction of the armour, so as to give the greatest possible perfection to the magnet, must ascertain that degree; which he can only do by trials—as it were, by continual gropings in the dark.

Kircher, in his book de Magnete, says, that the best way to arm a loadstone, is to drill a hole through it, from pole to pole, in which is to be placed a steel rod of a moderate length: this rod, he asserts, will take up more weight at the end, than the stone itself when armed in the common way: and Gassendus, as well as Cabæus, prescribe the same way of arming. But Muschenbroek found by repeated trials, that the usual armour, such as described by our author, is far preferable to Kircher's; and indeed instances are authentically recorded, in which such an armour has multiplied the natural intensity of the loadstone, a hundred, or even a hundred and fifty times.

MAGNETISM (*Animal.*) See ANIMAL.

MAGNETISM *of the Earth*, is that which is indicated by the polarity and inclination of the magnetic needle, and has been a fruitful source of speculations.

It could not be that a phenomenon so general, and so interesting and important as the natural polarity of magnetic bodies would be long known without exciting curiosity about its cause. Accordingly the philosophers of the sixteenth century speculated much about it, and entertained a variety of opinion, if that can be called an opinion which can hardly be said to express a thought. We have in Marsigli Ficino a short notice of many of these opinions. Some maintained that the needle was directed by a certain point in the heavens, as if that were saying more than that it always pointed one way. Others, with more appearance of reasoning, ascribed the direction to vast magnetic rocks. But all this was without giving themselves the trouble of trying to ascertain what situation of such rocks would produce the direction that is observed. Fracastori was, if we mistake not, the first who thought this trouble at all necessary; and he observes very sensibly, that if those rocks are supposed to be in any place yet visited by navigators, and if they act as loadstones do (a circumstance which he says must be admitted, if we attempt to explain), the direction of the needle will be very different from what we know it to be. He therefore places them in the inaccessible polar regions, but not in the very pole. Norman, the discoverer of the dip of the mariner's needle, or of the true magnetic direction, was naturally led by his discovery to conceive the directing cause as placed in the earth; because the north point of the needle, in every part of Europe, points very far below the horizon. But although he calls the treatise in which he announces his discovery the New Attractive, he does not express himself as supposing the needle to be attracted by any point within the earth, but only that it is always directed to that point.

It is to Dr. Gilbert of Colchester that we owe the opinion now universally admitted, that magnetic polarity is a part of the constitution of this globe. Norman had, not long before, discovered, that if a steel needle be very exactly balanced on a horizontal axis, like the beam of a common balance, so that it would retain any position given it, and if to be then touched with a magnet, and placed on its axis in the magnetic meridian, it is no longer in equilibrio, but (at London) the north point of it will dip 72 or 73 degrees below the horizon. He did not, however, publish his discovery till he had obtained information how it stood in other parts of the world. The differences in the variation in different places naturally suggested the necessity of this to him. Being a maker of mariner's compasses, and teacher of navigation in London, he had the fairest opportunities that could be desired, by furnishing dipping needles to such of the navigators, his scholars, as he knew most able to give him good information. And the accounts which he received made his discovery, when announced to the world, a very complete thing; for the commanders of ships engaged in long voyages, and particularly to China, informed him that, in the vicinity of the equator, his dipping needles remained parallel to the horizon, but that in coming toward the north pole, the north end of the needle was depressed, and that the south end dipped in like manner at the Cape of Good Hope, and in the Indian Ocean; that the needle gradually approached the horizontal position as the ship approached the equator, but that in coming to the north of it at Batavia, the north point again dipped, and at Canton was several degrees below the horizon.

On these authorities, Norman boldly said that, in the equatoreal regions, the needle was horizontal, and that either end dipped regularly as it approached either pole; and that in the poles of the earth, the needle was perpendicular to the horizon. He therefore announced this as a discovery, not only singularly curious, but also of immense importance; for by means of a dipping needle the latitude of a ship at sea may be found without seeing the sun or stars.

Dr. Gilbert, comparing this position of the compass needle with the positions which he had observed small needles assume in his numerous experiments in relation to a magnet, as we have described at great length, was naturally led to the notion of the earth's being a great loadstone, or as containing one, and that this arranged the dipping, or, in general, the mariner's needle, in the same manner as he observed a great magnet arrange a small needle poised on its pivot. He therefore composed his Physiologia Nova de Magnete, et de Tellure magno Magnete; in which

he notices so many points of resemblance to the directive power of a magnet, that the point seems no longer to admit of any doubt. Dr. Gilbert's theory may be thus expressed:

All the phenomena of natural magnetism are analogous to what we should observe, if the earth were a great magnet, having its poles near the poles of the earth's equator, the north pole not far from Baffin's Bay, and the south pole nearly in the opposite part of the globe. A dipping needle, under the influence of this great magnet, must arrange itself in a plane which passes through the poles of the magnet, the position of which plane is indicated (at least nearly) by the ordinary compass needle; and it will be inclined to the horizon so much the more as we recede from the equator of the great magnet.

This opinion of Dr. Gilbert was not less ingenious than important; and if firmly established, it furnishes a complete theory of all the phenomena of magnetism. But observations were neither sufficiently numerous in the time of Dr. Gilbert, nor sufficiently accurate, to enable that great genius to assign the position of this great magnet, nor the laws of its action. The theory was chiefly founded on the phenomena of the dipping needle; phenomena which might have been unknown for ages, had the first notice of them fallen into any other hands than Norman's. They are not, like those of variation, which might be made by any sailor. They require for their exhibition a dipping needle, and the attention to circumstances which can occur only to a mathematician. A dipping needle is to this day notwithstanding all our improvements in the arts, one of the most delicate and difficult tasks that an instrument maker can take in hand, and a good one cannot be had for less than twenty guineas. We are confident that such as even Norman could make were far inferior to what are now made, and quite unfit for use at sea while the ship is under sail, although they may be tolerably exact for the observation of the dip in any port; and we presume that it was such observations only that Norman confided in. Our readers will readily conceive the difficulty of poising a needle with such a perfect coincidence of its centre of gravity and axis of motion, and perfect roundness of this axis, that it shall remain in any position that is given it. Add to this, that a grain of dust, invisible to the nicest eye, getting under one side of this axis, may be sufficient for making it assume another position. It must also be a difficult matter to preserve this delicate thing, so as that no change can happen to it. Besides, all this must be performed on a piece of tempered steel which we are certain has no magnetism. Where can this be got, or what can assure us against magnetism? Nor is there less difficulty in making the observations without great risk of error. If the needle, moveable only in a vertical plane, be not set in the plane of a magnetic meridian, it will always dip too much. At London, where the magnetic direction is inclined 73° to the horizon, if it be in a plane 20° from the magnetic meridian, it will stand almost perpendicular; for it is easy to see, by the mechanical resolution of forces, that it will take the position which brings it nearest to the true magnetic direction. This, we think, is confirmed by several of Norman's and other old observations of dip. They are much greater than they have been since found in the same places.

Mr. Daniel Bernoulli has given a very ingenious principle, by which we can make a dipping needle which will give a very accurate observation on shore; and being so easily executed, it deserves to be generally known. Let a dipping needle be made in the best manner that can be done by a workman of the place, and balanced with some care before impregnation, so that we may be certain that when touched it will take nearly the true dip. Touch it, and observe the dip. Destroy its magnetism, and then alter its balance in such a manner that, without any magnetism, it will arrange itself in the inclination of the observed dip. Now touch it again, giving it the same poles as before. It is plain that it will now approach exceedingly near indeed to the true dip, because its want of perfect equilibrium deranged it but a few degrees from the proper direction. If this second observation of the dip should differ several degrees from the first, by the inaccurate first formation of the needle, it will be proper to repeat the operation. Very rarely indeed will the third observation of the dip vary from the truth half a degree.

Mr. Bernoulli makes this simple contrivance answer the purpose of an universal instrument, in the following ingenious manner. A very light brass graduated circle fixed to one side of the needle, concentric with its axis, and the whole balanced as nicely as possible before impregnation. A very light index is then fitted on the axis, so as to turn rather stiffly on it. This will destroy the equilibrium of the needle. If the needle has been made with perfect accuracy, and perfectly balanced, the addition of this index would cause it always to settle with the index perpendicular to the horizon, whatever degree of the circle it may chance to point at. But as this is scarcely to be expected, set the index at various degrees of the circle, and note what inclination the unmagnetic needle takes for each place of the index, and record them all in a table. Suppose, for example, that when the index is at 50, the needle inclines 46° from the horizon. If in any place we observe that the needle (rendered magnetic by lying between two strong magnets), having the index at 50, inclines 46°, we may be certain that this is the dip at that place; for the needle is not deranged by the magnetism from the position which gravity alone would give it. As we generally know something of the dip that is to be expected in any place, we must set the index accordingly. If the needle does not shew the expected dip, alter the position of the index, and again observe the dip. See whether this second position of the index and this dip form a pair which is in the table. If they do, we have got the true dip. If not, we must try another position of the index. Noticing whether the agreement of this last pair be greater or less than that of the former pair, we learn whether to change the position of the index in the same direction as before, or in the opposite. The late Dr. Robison had a dipping needle of this kind, made by a person totally unacquainted with the making of philosophical instruments. It was used at Leith, at Cronstadt in Russia, at Scarborough, and at New York, and the dip indicated by it did not in any single trial differ 1½ degrees from other trials, or from the dip observed by the finest instruments. He tried it himself in Leith Roads, in a rough sea; and does not think it inferior, either in certainty or dispatch, to a needle of the most elaborate construction. It is worthy of its most ingenious author, and of the public notice, because it can be made

for a moderate expence, and therefore may be the means of multiplying the observations of the dip, which are of immense consequence in the theory of magnetism, and for giving us an accurate knowledge of the magnetical constitution of this globe.

This knowledge is still very imperfect, owing to the want of a very numerous collection of observations of the dip. They are of more importance than those of the horizontal deviations from the meridian All that we can say is, that the earth acts on the mariner's needle as a great loadstone would do. But we do not think that the appearances resemble the effects of what we would call a good loadstone, having the regular magnetism of two vigorous poles. The dips of the needle in various parts of the earth seem to be such as would result from the action of an extremely irregular loadstone, having its poles exceedingly diffused. The increase of the dip, as we recede from those places where the needle is horizontal, is too rapid to agree with the supposition of two poles of constipated magnetism, whether we suppose the magnetic action in the inverse simple or duplicate ratio of the distances, unless the great terrestrial magnet be of much smaller dimensions than what some other appearances oblige us to suppose. If there be four poles, as Dr. Halley imagined, it will be next to impossible to ascertain the positions of the dipping needle. It will be a tangent to one of the secondary magnetic curves, and these will be of a very intricate species. We cannot but consider the discovery of the magnetic constitution of this globe as a point of very great importance, both to the philosopher and to society. We have considered it with some care; but hitherto we have not been able to form a systematic view of the appearances which gives us any satisfaction. The well informed reader is sensible, that the attempt by means of the horizontal or variation needle is extremely tedious in its application, and is very unlikely to succeed; at the same time it must be well understood. The two dissertations by Euler, in the 13th and 22d volumes of the Memoirs of the Royal Academy at Berlin, are most excellent performances, and give a true notion of the difficulty of the subject. Yet, even in these, a circumstance is overlooked, which, for any thing we know to the contrary, may have a very great effect. If the magnetic axis be far removed from the axis of revolution, as far, for example, as Mr. Churchman places it, the magetic meridians will be (generally) much inclined to the horizon; and we shall err very far, if we suppose (as in Euler's calculus) that the dipping needle will arrange itself in the vertical plane, passing through the direction of the horizontal or variation needle; or if we imagine that the poles of the great magnet are in that plane. We even presume to think that Mr. Euler's assumption of the place of his fictitious poles (namely, where the needle is vertical), in order to obtain a manageable calculus, is erroneous. The introduction of this circumstance of inclination of the magnetic meridians to the horizon, complicates the calculation to such a degree as to make it almost unmanageable, except in some selected situations. Fortunately, they are important ones for ascertaining the places of the poles. But the investigation by the positions of the dipping needle is incomparably more simple, and more likely to give us a knowledge of a multiplicity of poles. The consideration of the magnetic curves (in the sense used in the present article), teaches us that we are not to imagine the poles immediately under those parts of the surface where the needle stands perpendicular to the horizon, nor the magnetic equator to be in those places where the needle is horizontal; a notion commonly and plausibly entertained. Unfortunately our most numerous observations of the dip are not in places where they are the most instructive. A series should be obtained, extending from New Zealand northward, across the Pacific Ocean to Cape Fairweather on the west coast of North America, and continued through that part of the continent. Another series should extend from the Cape of Good Hope, up along the west coast of Africa to the tropic of Capricorn; from thence across the interior of Africa (where it would be of great importance to mark the place of its horizontality) through Sicily, Italy, Dalmatia, the east of Germany, the Gulph of Bothnia, Lapland, and the west point of Greenland. This would be nearly a plane passing through the probable situation of the poles. Another series should be made at right angles to this, forming a small circle, crossing the other near Cape Fairweather. This would pass near Japan, through Borneo, and the west end of New Holland; also near Mexico, and a few degrees west of Easter Island. In this place, and at Borneo, the inclination of the magnetic plane to the horizon would be considerable, but we cannot find this out. It may, however, be discovered in other points of this circle, where the dip is considerable. We have not room in this short account to illustrate the advantages derived from these serieses; but the reflecting reader will be very sensible of them, if he only supposes the great magnet to be accompanied by its magnetic curves, to which the needle is always a tangent. He will then see that the first series from New Zealand to Cape Fairweather, and the second from Cape Fairweather round the other side of the globe, being in one plane, and at very different distances from the magnetic axis, must contain very instructive positions of the needle. But we still confess, that when we compare the dips already known with the variations, they appear so irreconcileable with the results of an uniform regular magnetism, that we despair of success. Every thing seems to indicate a multiplicity of poles, or, what is still more adverse to all calculation, an irregular magnetism with very diffused polarity.

Much instruction may surely be expected from the observations of the Russian academicians and their eleves, who are employed in surveying that vast empire; yet we do not meet with a single observation of the dip of the needle in all the publications of that academy, nor indeed are there many of the variation.

For want of such information, philosophers are extremely divided in their opinions of the situations of the magnetic poles of this globe. Professor Krafft, in the 17th volume of the Petersburgh Commentaries, places the north pole in lat. 70. N. and long. 23. W. from London; and the south pole in lat. 50. S. and long. 92. E.

Wilcke of Stockholm, in his indication chart (*Swed. Mem.* tom. xxx. p. 218.), places the north pole in lat. 75. N: near Baffin's Bay, in the longitude of California. The south pole is in the Pacific Ocean, in lat. 70. S.

Churchman places the north pole in lat. 59. N.

and long. 135. W. a little way inland from Cape Fairweather; and the south pole in lat. 59. S. long. 165 E. due south from New Zealand.

A planisphere by the Academy of Sciences at Paris for 1786, places the magnetic equator so as to intersect the earth's equator in long. 75, and 155. from Ferro Canary Island, with an inclination of 12 degrees nearly, making it a great circle very nearly. But we are not informed on what authority this is done, and it does not accord with many observations of the dip which we have collected from the voyages of several British navigators, and from some voyages between Stockholm and Canton. Mr. Churchman has given a sketch of a planisphere with lines, which may be called parallels of the dip. Those parts of each parallel that have been ascertained by observation are marked by dots, so that we can judge of his authority for the whole construction. It is but a sketch, but gives more synoptical information than any thing yet published. The magnetic equator cuts the earth's equator in long. 15, and 195 E. from Greenwich, in an angle of nearly 17 degrees. The circles of magnetic inclination are not parallel, being considerably nearer to each other on the short meridian than on its opposite. This circumstance, being founded on observation, is one of the strongest arguments for the existence of a magnet of tolerable regularity, as the cause of all the positions of the compass needle; for such *must* be the positions of the circles of equal dip if the axis of this magnet is far removed from the axis of rotation, and does not intersect it.

M. Biot and Arrago, supposing the magnetic equator to be a great circle of the terrestrial sphere, determine that the inclination of this plane to the astronomical equator, is equal to 12·2025 of the decimal division (10 58′ 56″ of the common division), and its occidental node on that equator is at 133·3719 (120 2′ 5″) longitude west from Paris, that is, a little beyond the continent of America, near the Gallipagos, in the South sea; the other node is at 66.6281 (59 57′ 55″) eastward of Paris, that is to say, in the Indian seas. The points where the axis of the magnetic equator pierces the earth's surface, are, the northern point at 87·7975 (79 1′ 4″) of north latitude, and at 33·3719 (30 2′ 5″) of longitude west from Paris.—the southern point is situated in the same latitude south, and 166·6281 (149 57′ 55″) of longitude east from Paris. It is remarkable that this determination of the magnetic equator agrees almost perfectly with that given 40 years ago by Wilke and Lemonnier. Can it be by chance that these elements found so long ago should accord so well with those determined from recent observations? Or, does the inclination of the magnetic equator experience only very small variations, while all the other symptoms of terrestrial magnetism change so rapidly? Humboldt and Biot incline to the latter opinion; and this because the inclination of the magnetic needle has changed at Paris only 3° during 60 years, and at London only 2° in 200 years, while the variation of declination in the latter period has been full 30 degrees.

2. With respect to the intensity of the magnetic force in different parts of the earth, these philosophers have ascertained that it varies in different latitudes, its increase proceeding from the equator towards the poles. The needles of Humboldt's compass, which, at his departure, gave at Paris 245 oscillations in 10 minutes, gave no more in Peru than 211, and it constantly varied in the same direction; that is to say, the number of the oscillations always decreased by approaching the magnetic equator, and always increased by advancing towards the north. The difference can neither be ascribed to a diminution of magnetic force in the compass, nor to the effects of heat or of time; for after three year's residence in the warmest countries of the earth, the same compass gave again in Mexico oscillations as rapid as at Paris.

There are some anomalies, however, occasioned by local causes. Thus Biot having, in the summer of 1801, carried to the Alps the magnetic needle employed in one of his previous aërial excursions, he found that its tendency to return to the magnetic meridian was constantly stronger in those mountains than it was at Paris before his departure, and than it had been since his return. This needle, which made at Paris 83·9 oscillations in 10 minutes of time, gave oscillations as below at the places mentioned, in the same interval of 10 minutes: viz. Paris, before departure, 83·9; Turin, 87·2; on mount Genêvre, 88·2; Grenoble 87·4; Lyons, 87·3; Geneva, 86·5: Dijon, 84·5; Paris, after his return, 83.9. It appears to result from these observations that the action of the Alps has a perceptible influence on the intensity of the magnetic force. Humboldt observed analogous effects at the bottom of the Pyrenees, for instance, at Perpignan. It is not improbable that they arose from the mass of these mountains, or the ferruginous matters contained in them: but whatever may be the cause, it is hence manifest that the general action of terrestrial magnetism is sensibly modified by local circumstances, the differences of which may be perceived in places very little distant from each other.

For more on this subject see the articles DECLINATION, DIPPING *needle*, &c. and the 2d volume of Haüy's Natural Philosophy.

MAGNIFI'ABLE. *a.* (from *magnify.*) Worthy to be extolled or praised. Unusual (*Brown*).

MAGNI'FICAL. } *a.* (*magnificus*, Latin.)
MAGNI'FICE. } Illustrious; grand (*Mil.*)

MAGNI'FICENCE. *s.* (*magnificentia*, Lat.) Grandeur of appearance; splendour (*Milton*).

MAGNI'FICENT. *s.* (*magnificus*, Latin.) 1. Grand in appearance; splendid; pompous (*Addison*). 2. Fond of splendour; setting greatness to show (*Sidney*).

MAGNI'FICENTLY. *ad.* (from *magnificent.*) Pompously; splendidly (*Grew*).

MAGNI'FICO. *s.* (Italian.) A grandee of Venice (*Shakspeare*).

MA'GNIFIER. *s.* (from *magnify.*) 1. One that praises; an encomiast; an extoller (*Brown*). 2. A glass that increases the bulk of any object.

To MA'GNIFY. *v. a.* (*magnifico*, Latin.) 1. To make great; to exaggerate; to amplify; to extol (*Bacon*). 2. To exalt; to elevate; to raise in estimation (*Milton*). 3. To raise in pride or pretension (*Daniel*). 4. To increase the bulk of any object to the eye (*Locke*).

MA'GNITUDE. *s.* (*magnitudo*, Latin.) 1. Greatness; grandeur (*Milton*). 2. Comparative bulk (*Newton*).

MAGNOLIA. In botany, a genus of the class polyandria, order polygamia. Calyx three-leaved; petals from six to nine; capsules two-valved, imbricate; seeds berried, pennulous. Nine species; chiefly natives of America; a few of India. The following are the chief.

1. M. Grandiflora; great magnolia. Leaves perennial, oblong, a little waved; flowers large, white; petals obovate. The plant rises eighty feet high, with a straight trunk, more than two feet in diameter, with a regular head.

2. M. Nipetala. Umbrella-tree. Leaves lanceolate; outer petals hanging down, generally ten or eleven to each corol, and white of colour, and fragrant. The plant rises from fifteen to twenty feet high with a slender trunk, and soft spongy wood.

3. M. Acuminata. Spear-shaped magnolia. Leaves ovate, oblong, pointed, green on both sides: flowers twelve white petals; wood yellow.

4. M. Glauca. Small magnolia. Leaves elliptic, obtuse glaucous underneath; petals obovate. It rises from ten to fifteen inches high, with a slender stem, the wood of which is white and spongy. The flowers are terminal, white, and fragrant.

MAGNON (John), a French poet of the 17th century, was for some time an advocate at Lyons. He then became a dramatic writer, but his pieces are detestable. He formed the design of writing an Encyclopédia in verse, to make ten volumes; but this scheme was destroyed by the author's being murdered by some thieves in 1662.

MAGNUS (John), archbishop of Upsal in Sweden, was born in 1488. He greatly opposed the reformation in Sweden, but finding his efforts ineffectual, retired to Rome, where he died 1544. He wrote a History of Sweden, and a History of the Archbishops of Upsal, both in folio.

MAGNUS (Olaus), brother and successor to the preceding. He was at the Council of Trent, where he displayed considerable abilities. Being a zealous catholic, he found it necessary to quit his native country when the protestant religion was established, and died at Rome in 1655. His greatest work is a History of the Manners, Customs, and Wars, of the People of the North.

MAGNY, a town of France, in the department of Seine and Oise, 32 miles NW. of Paris. Lon. 1. 54. E. Lat. 49. 10. N.

MAGODUS, among the Romans, in a name given to those players who sometimes acted the part of men, and sometimes of women: the word is derived from μαγος, *magic*, and ῳδος *singer*, and properly denotes those players who performed extraordinary feats and gestures.

MAGOPHONIA, formed from μαγ☉, *magus*, and φονος, *slaughter*, the name of a feast among the ancient Persians, held in memory of the expulsion of the Magians.

MAGOT, in mastiology. See SIMIA.

MAGPIE, in ornithology. See CORVUS.

MAHALEB. In botany, a name for one or two of the species of PRUNUS, which see.

MAHERNIA. In botany, a genus of the class pentandria, order pentagynia. Calyx five-toothed; petals five; nectaries five, united at the base, inversely heart-shaped, placed under the filaments; capsule five-celled. Nine species, all shrubs or shrubby plants of the Cape, and some of them very beautiful.

MAHIE, or *Bread-fruit-tree*. See ARTOCARPUS.

MAHO-TREE. A name given by some writers to one or two species of HIBISCUS, which see.

MAHOGANY-TREE. See SWEITENIA.

MAHOMET, or MOHAMMED, styled the *Impostor*, was born in the reign of Anushirwan the Just, emperor of Persia, about the end of the 6th century of the Christian æra. He came into the world under some disadvantages. His father Abd'allah was a younger son of Abd'almotalleb; and dying very young, and in his father's lifetime, left his widow and infant son in very mean circumstances, his whole substance consisting but of five camels and one Ethiopian she-slave. Abd'almotalleb was therefore obliged to take care of his grandchild Mahomet; which he not only did during his life, but at his death enjoined his eldest son Abu Taleb, who was brother to Abd'allah by the same mother, to provide for him for the future: which he very affectionately did, and instructed him in the business of a merchant, which he followed; and to that end he took him into Syria when he was but 13. He afterwards recommended him to Khadijah, a noble and rich widow, for her factor; in whose service he behaved himself so well, that by making him her husband she soon raised him to an equality with the richest in Mecca.

After he began by this advantageous match to live at his ease, it was, that he formed the scheme of establishing a new religion, or, as he expressed it, of replanting the only true and ancient one professed by Adam, Noah, Abraham, Moses, Jesus, and all the prophets, by destroying the gross idolatry into which the generality of his countrymen had fallen, and weeding out the corruptions and superstitions which the latter Jews and Christians had, as he thought, introduced into their religion, and reducing it to its original purity, which consisted chiefly in the worship of one only God.

Before he made any attempt abroad, he rightly judged that it were necessary for him to begin with the conversion of his own household. Having therefore retired with his family, as he had done several times before, to a cave in mount Hara, he there opened the secret of his mission to his wife Khadijah; and acquainted her, that the angel Gabriel had just before appeared to

had just before appeared to him, and told him that he was appointed the apostle of God: he also repeated to her a passage which he pretended had been revealed to him by the ministry of the angel, with those other circumstances of this first appearance, which are related by the Mahometan writers. Khadijah, or Cadiga, received the news with great joy; swearing by him in whose hands her soul was, that she trusted he would be the prophet of his nation; and immediately communicated what she had heard to her cousin Warakah Ebn Nawfal, who, being a Christian, could write in the Hebrew character, and was tolerably well versed in the scriptures; and he as readily came into her opinion, assuring her that the same angel who had formerly appeared unto Moses was now sent to Mahomet. The first overture the prophet made was in the month of Ramadan, in the 40th year of his age, which is therefore usually called the year of his mission.

Encouraged by so good a beginning, he resolved to proceed vigorously, though cautiously, in his bold design. Withdrawing himself, therefore, from the society of the dissipated, he assumed a character of superior sanctity, and every morning retiring to a solitary cave near Mecca, he devoted the day to abstemiousness, and holy meditation. Well tutored in the arts of hypocrisy, he, in his 40th year, assumed the title of the apostle of God, and gradually increased his fame and his followers by the aid of pretended visions. Though his doctrines were embraced at first only by his wife Cadiga, and eight other dependants, yet in the fifth year of his mission his followers increased to the number of 39. Enemies, however, were not wanting to oppose him; and while some heaped on him the odious appellations of an impostor and magician, others foresaw his rapid strides to the sovereign power. Mahomet, notwithstanding, overcame all opposition: in proclaiming himself the prophet appointed by God, to propagate a new religion, he flattered the prejudices of his nation; and among a people whose climate is exposed to a scorching sun, he allured the imagination by painting rivers of cooling waters, shaded retreats, luxurious fruits, and all the sensual delights of the immaculate houris, for the happy proselytes of his doctrine; while he denounced against his enemies, not only dreadful visitations in the present life, and exclusion from paradise, but a habitation in a continual fire, surrounded with a black hot salt smoke, without the ability of breathing any but the most noxious heated air, and of drinking the most nauseous water. This was not announced as the figurative language of an impostor, but the prophet delivered them as the command of God, and produced occasionally various chapters, which had been copied from the archives of heaven, brought down by the angel Gabriel. Whatever difficulties arose, were quickly reremoved by the condescension of the angel, and a fresh revelation came from heaven on every trying occasion, to support the character of Mahomet. When the proselytes demanded miracles from a prophet who called himself superior to Moses and to Christ, the impostor declared, that God had sent Moses and Jesus with miracles, and yet that men would not obey them, and that therefore he had sent Mahomet in the last place, without miracles, to force them by the power of the sword to do his will. Thus commissioned by heaven, he refused longer to answer questions, and when he found himself exposed to danger at Mecca, he left the city, and retired to Medina, where his doctrines found a more friendly reception. This event, which happened about the 16th July, 622, forms the celebrated era of the Mahometans, called the hegira, or flight from Mecca. At Medina, the prophet erected his standard; and as for 13 years before he had endeavoured to spread his doctrines by persuasion, he now propagated them by the sword. The two first years were employed in predatory excursions against caravans; but after exterminating several of the tribes of Arabia, he at last marched against Mecca, and after a battle, granted a truce to his enemies, by which he not only confirmed his power as a prophet, but assumed the title of sovereign over his nation. He next turned his arms against Caibar, and after he had taken it by storm, he fixed his abode in the house of one of the principal men of the place, whose daughter placed before him a poisoned shoulder of mutton. The poison was so powerful, that Basher, one of his attendants, died immediately; but the impostor himself, though he only tasted the meat, never fully recovered his strength, and perished three years after in consequence of the fatal food. The accident might have shaken the faith of his followers, as the woman declared, that if he were a prophet, he would have known that the meat was poisoned; but Mahomet enforced the tenets of predestination in his favour. His next expedition was against Mecca, which had broken the truce, and though defeated in one battle, he secured the victory; and so exerted his power over the neighbouring tribes, that in the 10th year of the hegira his empire and his religion had enslaved the whole of Arabia. As he had recommended to his followers a pilgrimage to Mecca, he himself performed it, whilst his officers were employed around in the destruction of heathen temples; and after instructing the various devotees which flocked from all parts of Arabia, he returned to Medina. It was his last journey; he soon after fell sick, the poison which three years before he had taken began to operate more powerfully, and after a confinement of 13 days, the prophet died, A. D. 632, aged 62. He was buried in the same place where he died, in the chamber of the most beloved of his wives, at Medina, where his remains are still preserved, and not in an iron coffin suspended in the air, between two loadstones, as vulgarly reported. By Cadiga, Mahomet had six children, one of whom only grew up, Fatima, but survived him only 60 days. After the death of Cadiga, the prophet, who had hitherto been satisfied with one wife, married several, and kept besides a great number of concubines. By none of his wives, who, ac-

cording to some, were 15, and according to others 21, he left issue; but of the ten who survived him, Ayesha the daughter of Abubecker, his successor, was the most beloved. So great was the influence of this celebrated female, that she prevented Ali, the husband of Fatima, from succeeding to the throne, because he had revealed her incontinence to the prophet. The success of Mahomet's imposture during his life-time is not more astonishing than the permanent establishment which his doctrines have maintained over so great a part of the globe, during near 1200 years. The Koran, in which are contained the tenets of his religion, is a compound of sublime truths, of incredible tales, and ludicrous events, delivered in a pleasing, elegant, and nervous style. That Mahomet, who was illiterate, should compose a book, deservedly esteemed, a standard of elegance, without divine assistance, was considered as impossible among his followers, and therefore they believed it to be the work of God. Mahomet, however, was assisted in the framing of his work by a Persian Jew, who was well versed in the learning of his country, and the laws of Moses; and by a christian monk of the nestorian sect. To the labours of these two men he was indebted for the composition of the koran, and hence we trace the frequent allusions to the mosaical institutions, and the history of Christ. Thus he was enabled to impose upon his followers, by interpreting various passages of the scriptures in his own favour, and by accusing the Jews and Christians of mutilation and interpolation, where he thought he found his character obscurely delineated. By calling himself the comforter whom Christ had promised to his disciples, he mightily prevailed with the credulous; and every true Mussulman believes, that several copies of the New Testament still contain an original text, which expressly foretels the coming of a prophet of the name of Mahomet. As Mahomet was subject to the falling sickness, he persuaded his disciples, that in those moments of suspended animation he accompanied the angel Gabriel in various journeys; and that borne by the celestial beast Alborak, he ascended up into the highest heavens, where he conversed with the Almighty, and received communications with respect to the laws and the religion with which he was to bless the earth. In these conferences, he saw the most renowned prophets of old; he spoke to Elijah, Moses, and Christ, and was honoured by the Creator himself with privileges above the rest of mankind. The koran has been elegantly translated into English, by Sale, in 2 vols. 4to. and 2 vols. 8vo.

Mahomet I. emperor of the Turks, was son of Bajazet I. and succeeded 1413. He was a brave and politic monarch. He restored to its ancient glory the power of the Ottomans, and conquered Cappadocia, Servia, Wallachia, and other provinces. He was at peace with Manuel Palæologus, to whom he restored some of his provinces, and died at Adrianople, of a bloody flux, 1421, aged 47.

Mahomet II. emperor of the Turks, succeeded his father Amurath, 1451. His reign was begun with preparations for war, Constantinople was besieged, and he conveyed over the land some of his gallies into the harbour, which the Greeks had shut up against the invaders. Constantinople yielded to the conqueror, 1453, and in her fall poured forth her fugitive philosophers and learned men to revive literature in the western world. Mahomet, by his victories, deserved the name of great, and the appellation of grand signior, which he assumed, and which has descended to his successors. After subduing two empires, 12 tributary kingdoms, and 200 towns, he was preparing the subjugation of Italy, when a colic proved fatal to him, 1481, after a reign of 31 years. His death was the cause of universal rejoicing over the christian world, whose religion he had sworn to exterminate, for the tenets of Mahomet. Though a warrior, Mahomet was cruel and tyrannical, and that he might glut his rage, his lust, and his ambition, neither rank, nor sex, nor age, were spared.

Mahomet III. succeeded his father Amurath III. 1595. He began his reign by ordering 19 of his brothers to be strangled, and 10 of his father's wives to be drowned. He made war against Rodolphus II. and invaded Hungary with an army of 200,000 men; but his progress was checked by Maximilian, the emperor's brother, who would have obtained a decisive victory, had not his troops abandoned themselves to pillage. Mahomet, obliged to retire from Hungary, and the neighbouring provinces, buried himself in the indolence of his seraglio. He died of the plague, 1603, aged 39.

Mahomet IV. succeeded 1649, on the death of his father Ibrahim I. He pursued the war with the Venetians, and after reducing Candia, with the loss of 200,00 men, he invaded Poland. His arms proved victorious, but the disgrace was wiped off by the valour of Sobieski, who the next year routed his enemies at the battle of Choezin. Vienna would have fallen in the next war, if Sobieski had not hastened to its relief, and destroyed the Turkish army. The blow was followed by the union of the emperor, the king of Poland, and the Venetians; and Mahomet, every where defeated, was deposed 1687, and sent to prison. He died in his confinement, 1691.

Mahomet V. son of Mustapha II. succeeded in 1730. His janissaries expected from him the recovery of the conquered provinces, but he lost Georgia and Armenia, which were conquered by Kouli-Khan. Mahomet died in 1754.

MAHOMETANISM, or Mahometism, the system of religion broached by Mahomet, and still adhered to by his followers. See Mahomet, and Alcoran.

Mahometanism is professed by the Turks, Persians, and several nations among the Africans, and many among the East Indians.

The Mahometans divide their religion into two general parts, faith and practice: of which the first is divided into six distinct branches: belief in God, in his angels, in his scriptures, in his prophets, in the resurrection and final judgment, and in God's absolute decrees. The points relating to practice

are, prayer, with washings, &c. alms, fasting, pilgrimage to Mecca, and circumcision.

I. *Of the Mahometan Faith.*—1. That both Mahomet, and those among his followers who are reckoned orthodox, had and continue to have just and true notions of God and his attributes, appears so plain from the Koran itself, and all the Mahometan divines, that it would be loss of time to refute those who suppose the God of Mahomet to be different from the true God, and only a fictitious deity or idol of his own creation.

2. The existence of angels, and their purity are absolutely required to be believed in the Koran; and he is reckoned an infidel who denies there are such beings, or hates any of them, or asserts any distinction of sexes among them. They believe them to have pure and subtle bodies, created of fire; that they neither eat nor drink, nor propagate their species; that they have various forms and offices, some adoring God in different postures, others singing praises to him, or interceding for mankind. They hold that some of them are employed in writing down the actions of men; others in carrying the throne of God, and other services.

The four angels whom they look on as more eminently in God's favour, and often mention on account of the offices assigned them, are Gabriel, to whom they give several titles, particularly those of the holy spirit, and the angel of revelations, supposing him to be honoured by God with a greater confidence than any other, and to be employed in writing down the divine decrees; Michael, the friend and protector of the Jews; Azrael, the angel of death, who separates men's souls from their bodies; and Israsil, whose office it will be to sound the trumpet at the resurrection. The Mahometans also believe, that two guardian angels attend on every man, to observe and write down his actions, being changed every day, and therefore called al Moakkibat, or "the angels who continually succeed one another."

The devil, whom Mahomet names Eblis, from his despair, was once one of those angels who are nearest to God's presence, called Azazil; and fell, according to the doctrine of the Koran, for refusing to pay homage to Adam at the command of God.

Besides angels and devils, the Mahometans are taught by the Koran to believe an intermediate order of creatures, which they call jin or genii, created also of fire, but of a grosser fabric than angels, since they eat and drink, and propagate their species, and are subject to death. Some of these are supposed to be good and others bad, and capable of future salvation or damnation, as men are; whence Mahomet pretended to be sent for the conversion of genii as well as men.

3. As to the Scriptures, the Mahometans are taught by the Koran, that God, in divers ages of the world, gave revelations of his will in writing to several prophets, the whole and every one of which it is absolutely necessary for a good Moslem to believe. The number of these sacred books was, according to them, 104. Of which 10 were given to Adam, 50 to Seth, 30 to Edris or Enoch, 10 to Abraham; and the other four, being the Pentateuch, *the Psalms, the Gospel, and the Koran, were successively delivered to Moses, David, Jesus,* and Mahomet; which last being the seal of the prophets, those revelations are now closed, and no more are to be expected. All these divine books, except the four last, they agree to be now entirely lost, and their contents unknown; though the Sabians have several books which they attribute to some of the antediluvian prophets. And of those four, the Pentateuch, Psalms, and Gospel, they say, have undergone so many alterations and corruptions, that, though there may possibly be some part of the true word of God therein, yet no credit is to be given to the present copies in the hands of the Jews and Christians. The Mahometans have also a gospel in Arabic, attributed to St. Barnabas; wherein the history of Jesus Christ is related in a manner very different from what we find in the true gospels, and correspondent to those traditions which Mahomet has followed in his Koran. Of this gospel the Moriscoes in Africa have a translation in Spanish; and there is, in the library of prince Eugene of Savoy, a manuscript of some antiquity, containing an Italian translation of the same gospel; made, it is to be supposed, for the use of renegades. This book appears to be no original forgery of the Mahometans; though they have, no doubt, interpolated and altered it since, the better to serve their purpose; and in particular, instead of the paraclete, or comforter, they have in this apocryphal gospel inserted the word periclyte, that is, the famous, or illustrious; by which they pretend their prophet was foretold by name, that being the signification of Mohammed in Arabic: and this they say to justify that passage of the Koran, where Jesus Christ is formally asserted to have foretold his coming, under his other name of Ahmed, which is derived from the same root as Mohammed, and of the same import. From these, or some other forgeries of the same stamp, it is that the Mahometans quote several passages, of which there are not the least footsteps in the New Testament.

4 The number of the prophets which have been from time to time sent by God into the world amounts to no less than 224,000, according to one Mahometan tradition; or to 124,000, according to another; among whom 313 were apostles, sent with special commissions to reclaim mankind from infidelity and superstition; and six of them brought new laws or dispensations, which successively abrogated the preceding; these were Adam, Noah, Abraham, Moses, Jesus, and Mahomet All the prophets in general the Mahometans believe to have been free from great sins and errors of consequence, and professors of one and the same religion, that is, Islam, notwithstanding the different laws and institutions which they observed They allow of degrees among them, and hold some of them to be more excellent and honourable than others. The first place they give to the revealers and establishers of new dispensations, and the next to the apostles.

In this great number of prophets they not only reckon divers patriarchs and persons named in scripture, but not recorded to have been prophets, (wherein the Jewish and Christian writers have sometimes led the way) as Adam, Seth, Lot, Ishmael, Nun, Joshua, &c. and introduce some of them under different names, as Enoch, Heber, and Jethro, who are called, in the Koran, Edris, Hud, and Shoaib; but several others whose very names do not appear in scripture (though they endeavour to find some persons there to fix them on), as Saleh, Khedr, Dhu'lkefl, &c.

5. The belief of a general resurrection and a future judgment.

When a corpse is laid in the grave, they say he is received by an angel, who gives him notice of the coming of the two examiners; who are two black livid angels, of a terrible appearance, named Monker and Nakir. These order the dead person to sit upright; and examine him concerning his

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faith, as to the unity of God, and the mission of Mahomet: if he answer rightly, they suffer the body to rest in peace, and it is refreshed by the air of paradise; but if not, they beat him on the temples with iron maces, till he roars out for anguish so loud, that he is heard by all from east to west, except men and genii. They then press the earth on the corpse, which is gnawed and stung till the resurrection by 99 dragons, with seven heads each; or, as others say, their sins will become venomous beasts, the grievous ones stinging like dragons, the smaller like scorpions, and the others like serpents; circumstances which some understand in a figurative sense.

As to the soul, they hold that, when it is separated from the body by the angel of death, who performs his office with ease and gentleness towards the good, and with violence towards the wicked, it enters into that which they call al berzakh, or the interval between death and the resurrection. If the departed person was a believer, they say two angels meet it, who convey it to heaven, that its place there may be assigned, according to its merit and degree. For they distinguish the souls of the faithful into three classes: the first of prophets, whose souls are admitted into paradise immediately; the second of martyrs, whose spirits, according to a tradition of Mahomet, rest in the crops of green birds, which eat of the fruits and drink of the rivers of paradise; and the third of other believers, concerning the state of whose souls before the resurrection there are various opinions.

Though some among the Mahometans have thought that the resurrection will be merely spiritual, and no more than the returning of the soul to the place whence it first came (an opinion defended by Ebn Sina, and called by some the opinion of the philosophers); and others, who allow man to consist of body only, that it will be merely corporeal; the received opinion is, that both body and soul will be raised: and their doctors argue strenuously for the possibility of the resurrection of the body, and dispute with great subtility concerning the manner of it. But Mahomet has taken care to preserve one part of the body, whatever becomes of the rest, to serve for a basis of the future edifice, or rather a leaven for the mass which is to be joined to it. For he taught, that a man's body was entirely consumed by the earth, except only the bone called al ajb, which we name the os coccygis, or rumpbone; and that as it was the first formed in the human body, it will also remain uncorrupted till the last day, as a seed from whence the whole is to be renewed; and this, he said, would be effected by a forty years rain, which God should send, and which would cover the earth to the height of 12 cubits, and cause the bodies to sprout forth like plants. Herein, also, is Mahomet beholden to the Jews; who say the same things of the bone Luz, excepting that what he attributes to a great rain, will be effected, according to them, by a dew impregnating the dust of the earth.

The time of the resurrection the Mahometans allow to be a perfect secret to all but God alone; the angel Gabriel himself acknowledging his ignorance in this point, when Mahomet asked him about it. However, they say, the approach of that day may be known from certain signs which are to precede it. These signs they distinguish into two sorts, the lesser and the greater; which, however, we cannot detail here.

The greater signs, according to their doctrine, are to precede the resurrection, but still leave the hour of it uncertain; for the immediate sign of its being come will be the first blast of the trumpet, which they believe will be sounded three times. The first they call the blast of consternation; at the hearing of which all creatures in heaven and earth shall be struck with terror, except those whom God shall please to exempt from it. The effects attributed to this first sound of the trumpet are very wonderful: for they say the earth will be shaken, and not only all buildings, but the very mountains levelled; that the heavens shall melt, the sun be darkened, the stars fall, on the death of the angels, who, as some imagine, hold them suspended between heaven and earth; and the sea shall be troubled and dried up, or, according to others, turned into flames, the sun, moon, and stars being thrown into it: the Koran, to express the greatness of the terror of that day, adds, that women who give suck shall abandon the care of their infants, and even the she camels which have gone 10 months with young (a most valuable part of the substance of that nation) shall be utterly neglected. A farther effect of this blast will be that concourse of beasts mentioned in the Koran, though some doubt whether it be to precede the resurrection or not. They who suppose it will precede, think that all kinds of animals, forgetting their respective natural fierceness and timidity, will run together into one place, being terrified by the sound of the trumpet and the sudden shock of nature.

The Mahometans believe that this first blast will be followed by a second, which they call the blast of exinanition; by which all creatures both in heaven and earth shall die or be annihilated, except those which God shall please to exempt from the common fate; and this, they say, shall happen in the twinkling of an eye, nay in an instant; nothing surviving except God alone, with paradise and hell, and the inhabitants of those two places, and the throne of glory. The last who shall die will be the angel of death.

Forty years after this will be heard the blast of resurrection, when the trumpet shall be sounded the third time by Israfil, who, together with Gabriel and Michael, will be previously restored to life, and, standing on the rock of the temple of Jerusalem, shall, at God's command, call together all the dry and rotten bones, and other dispersed parts of the bodies, and the very hairs to judgment. This angel having, by the divine order, set the trumpet to his mouth, and called together all the souls from all parts, will throw them into his trumpet, from whence, on his giving the last sound, at the command of God, they will fly forth like bees, and fill the whole space between heaven and earth, and then repair to their respective bodies, which the opening earth will suffer to arise; and the first who shall so arise, according to a tradition of Mahomet, will be himself. For this birth the earth will be prepared by the rain above-mentioned, which is to fall continually for 40 years, and will resemble the seed of a man, and be supplied from the water under the throne of God, which is called living water; by the efficacy and virtue of which the dead bodies shall spring forth from their graves as they did in their mother's womb, or as corn sprouts forth by common rain, till they become perfect; after which breath will be breathed into them, and they will sleep in their sepulchres till they are raised to life at the last trumpet.

When those who have risen shall have waited the limited time, the Mahometans believe God will at length appear to judge them; Mahomet undertaking the office of intercessor, after it shall have

been declined by Adam, Noah, Abraham, and Jesus, who shall beg deliverance only for their own souls. They say, that on this solemn occasion God will come in the clouds surrounded by angels, and will produce the books wherein the actions of every person are recorded by their guardian angels, and will command the prophets to bear witness against those to whom they have been respectively sent. Then every one will be examined concerning all his words and actions uttered and done by him in this life; not as if God needed any information in these respects, but to oblige the person to make public confession and acknowledgment of God's justice. The particulars, of which they shall give an account, as Mahomet himself enumerated them, are, of their time, how they spent it; of their wealth, by what means they acquired it, and how they employed it; of their bodies, wherein they exercised them; of their knowledge and learning, what use they made of them. To the questions we have mentioned, each person shall answer, and make his defence in the best manner he can, endeavouring to excuse himself by casting the blame of his evil deeds on others; so that a dispute shall arise even between the soul and the body, to which of them their guilt ought to be imputed: the soul saying, "O Lord, my body I received from thee; for thou createdst me without a hand to lay hold with, a foot to walk with, an eye to see with, or an understanding to apprehend with, till I came and entered into this body, therefore punish it eternally but deliver me." The body, on the other side, will make this apology: "O Lord, thou createst me like a stock of wood, having neither hand that I could lay hold with, nor foot that I could walk with, till this soul, like a ray of light, entered into me, and my tongue began to speak, my eye to see, and my foot to walk: therefore punish it eternally, but deliver me." But God will propound to them the following parable of the blind man and the lame man, which, as well as the preceding dispute, was borrowed by the Mahometans from the Jews. A certain king, having a pleasant garden, in which were ripe fruits, set two persons to keep it, one of whom was blind, and the other lame; the former not being able to see the fruit, nor the latter to gather it: the lame man, however, seeing the fruit, persuaded the blind man to take him upon his shoulders, and by that means he easily gathered the fruit, which they divided between them. The lord of the garden coming some time after, and inquiring after his fruit, each began to excuse himself; the blind man said he had no eyes to see with; and the lame man, that he had no feet to approach the trees. But the king, ordering the lame man to be set on the blind, passed sentence on and punished them both. And in the same manner will God deal with the body and the soul. As these apologies will not avail on that day, so it will be in vain for any one to deny his evil actions; since men and angels, and his own members, nay, the very earth itself, will be ready to bear witness against him.

At this examination, they also believe, that each person will have the book wherein all the actions of his life are written delivered to him: which books the righteous will receive into their right hand, and read with great pleasure and satisfaction; but the ungodly will be obliged to take them, against their wills, in their left, which will be bound behind their backs, their right hand being tied up to their necks.

To show the exact justice which will be observed on this great day of trial, the next thing they describe is the balance, wherein all things shall be weighed. They say it will be held by Gabriel; and that it is of so vast a size, that its two scales, one of which hangs over paradise, and the other over hell, are capacious enough to contain both heaven and hell. Though some are willing to understand what is said in the Koran concerning this balance allegorically, and only as a figurative representation of God's equity; yet the more ancient and orthodox opinion is, that they are to be taken literally; and since words and actions, being mere accidents, are not capable of being themselves weighed, they say that the books wherein they are written will be thrown into the scales, and according as those wherein the good or evil actions are recorded shall preponderate, sentence will be given: those whose balances laden with good works shall be heavy, will be saved; but those whose balances are light, will be condemned. Nor will any one have cause to complain that God suffers any good action to pass unrewarded, because the wicked for the good they do have their reward in this life, and therefore can expect no favour in the next.

This examination being past, and every one's works weighed in a just balance, that mutual retaliation will follow, according to which every creature will take vengeance one of another, or have satisfaction made them for the injuries which they have suffered. And, since there will then be no other way of returning like for like, the manner of giving this satisfaction will be by taking away a proportional part of the good works of him who offered the injury, and adding it to those of him who suffered it. Which being done, if the angels (by whose ministry this is to be performed) say, "Lord, we have given to every one his due, and there remaineth of this person's good works so much as equalleth the weight of an ant," God will, of his mercy, cause it to be doubled unto him, that he may be admitted into paradise; but if, on the contrary, his good works be exhausted, and there remain evil works only, and there be any who have not yet received satisfaction from him, God will order that an equal weight of their sins be added unto his, that he may be punished for them in their stead, and he will be sent to hell laden with both. This will be the method of God's dealing with mankind. As to brutes, after they shall have likewise taken vengeance of one another, he will command them to be changed into dust; wicked men being reserved to more grievous punishment, so that they shall cry out, on hearing this sentence passed on the brutes, "Would to God that we were dust also!" As to the genii, many Mahometans are of opinion, that such of them as are true believers will undergo the same fate as the irrational animals, and have no other reward than the favour of being converted into dust: and for this they quote the authority of their prophet.

The trials being over, and the assembly dissolved, the Mahometans hold, that those who are to be admitted into paradise will take the right-hand way, and those who are destined to hell-fire will take the left; but both of them must first pass the bridge called in Arabic al Sirat, which they say is laid over the midst of hell, and describe to be finer than a hair, and sharper than the edge of a sword; so that it seems very difficult to conceive how any one shall be able to stand upon it; for which reason, most of the sect of the Motaz-

alites reject it as a fable; though the orthodox think it a sufficient proof of the truth of this article, that it was seriously affirmed by him who never asserted a falsehood, meaning their prophet: who, to add to the difficulty of the passage, has likewise declared, that this bridge is beset on each side with briars and hooked thorns: which will however be no impediment to the good; for they shall pass with wonderful ease and swiftness, like lightning, or the wind, Mahomet and his Moslems leading the way; whereas the wicked, what with the slipperiness and extreme narrowness of the path, the entangling of the thorns, and the extinction of the light which directed the former to paradise, will soon miss their footing, and fall down headlong into hell, which is gaping beneath them.

As to the punishment of the wicked, the Mahometans are taught, that hell is divided into seven stories or apartments, one below another, designed for the reception of as many distinct classes of the damned.

The first, which they call Jehennam, they say, will be the receptacle of those who acknowledge one God, that is, the wicked Mahometans: who after having there been punished according to their demerits, will at length be released. The second, named Ladha, they assign to the Jews: the third, named al Hotama, to the Christians; the fourth named al Sair, to the Sabians; the fifth, named Sakar, to the Magians; the sixth, named al Jahim, to the idolaters; and the seventh, which is the lowest and worst of all, and is called al Hawyet, to the hypocrites, or those who outwardly professed some religion, but in their hearts were of none. Over each of these apartments they believe there will be set a guard of angels, 19 in number; to whom the damned will confess the just judgment of God, and beg them to intercede with him for some alleviation of their pain, or that they may be delivered by being annihilated.

Mahomet has, in his Koran and traditions, been very exact in describing the various torments of hell, which, according to him, the wicked will suffer both from intense heat and excessive cold. We shall, however, enter into no detail of them here; but only observe, that the degrees of these pains will also vary in proportion to the crimes of the sufferer, and the apartment he is condemned to; and that he who is punished the most lightly of all will be shod with shoes of fire, the fervour of which will cause his skull to boil like a cauldron. The condition of these unhappy wretches, as the same prophet teaches, cannot be properly called either life or death; and their misery will be greatly increased by their despair of being ever delivered from that place, since, according to that frequent expression in the Koran, they must remain therein for ever. It must be remarked, however, that the infidels alone will be liable to eternity of damnation, for the Moslems, or those who have embraced the true religion, and have been guilty of heinous sins, will be delivered thence after they shall have expiated their crimes by their sufferings. The time which these believers shall be detained there, according to a tradition handed down from their prophet, will not be less than 900 years, nor more than 7000. And, as to the manner of their delivery, they say that they shall be distinguished by the marks of prostration on those parts of their bodies with which they used to touch the ground in prayer, and over which the fire will therefore have no power; and that, being known by this characteristic, they will be released by the mercy of God, at the intercession of Mahomet and the blessed: whereupon those who shall have been dead will be restored to life, as has been said; and those whose bodies shall have contracted any sootiness or filth from the flames and smoke of hell, will be immersed in one of the rivers of paradise, called the river of life, which will wash them whiter than pearls.

The righteous, as the Mahometans are taught to believe, having surmounted the difficulties, and passed the sharp bridge above mentioned, before they enter paradise, will be refreshed by drinking at the pond of their prophet, who describes it to be an exact square of a month's journey in compass; its water, which is supplied by two pipes from Al Cawthar, one of the rivers of paradise, being whiter than milk or silver, and more odoriferous than musk, with as many cups set around it as there are stars in the firmament; of which water whoever drinks will thirst no more for ever. This is the first taste which the blessed will have of their future and now near approaching felicity.

Though paradise be so very frequently mentioned in the Koran, yet it is a dispute among the Mahometans whether it be already created, or to be created hereafter; Motazalites and some other sectaries asserting, that there is not at present any such place in nature, and that the paradise which the righteous will inhabit in the next life will be different from that from which Adam was expelled. However, the orthodox profess the contrary, maintaining that it was created even before the world, and describe it, from their prophet's traditions, in the following manner:

They say it is situated above the seven heavens (or in the seventh heaven), and next under the throne of God; and, to express the amenity of the place, tell us, that the earth of it is of the finest wheat flour, or of the purest musk, or, as others will have it, of saffron: that its stones are pearls and jacinths, the walls of its buildings enriched with gold and silver; and that the trunks of all its trees are of gold, among which the most remarkable is the tree call Tuba, or the tree of happiness. Concerning this tree, they fable, that it stands in the palace of Mahomet, though a branch of it will reach to the house of every true believer; that it will be laden with pomegranates, grapes, dates, and other fruits, of surprising bigness, and of tastes unknown to mortals. So that if a man desire to eat of any particular kind of fruit, it will immediately be presented him; or, if he choose flesh, birds ready dressed will be set before him, according to his wish. They add, that the boughs of this tree will spontaneously bend down to the hand of the person who would gather of its fruits, and that it will supply the blessed not only with food, but also with silken garments, and beasts to ride on ready saddled and bridled, and adorned with rich trappings, which will burst forth from its fruits; and that this tree is so large, that a person, mounted on the fleetest horse, would not be able to gallop from one end of its shade to the other in 100 years.

As plenty of water is one of the greatest additions to the pleasantness of any place, the Koran often speaks of the rivers of paradise as a principal ornament thereof: some of these rivers,

they say, flow with water, some with milk, some with wine, and others with honey; all taking their rise from the root of the tree Tuba.

But all these glories will be eclipsed by the resplendent and ravishing girls of paradise, called from their large black eyes Hur al oyun, the enjoyment of whose company will be a principal felicity of the faithful. These, they say, are created, not of clay, as mortal women are, but of pure musk; being, as their prophet often affirms in his Koran, free from all natural impurities, defects, and inconveniences incident to the sex, of the strictest modesty, and secluded from public view in pavilions of hollow pearls, so large, that as some traditions have it, one of them will be no less than four parasangs (or, as others say, 60 miles) long, and as many broad.

The name which the Mahometans usually give to this happy mansion is al Jannat, or the garden; and sometimes they call it, with an addition, Jannat al Ferdaws, the garden of paradise; Jannat Aden, the garden of Eden, (though they generally interpret the word Eden, not according to its acceptation in Hebrew, but according to its meaning in their own tongue, wherein it signifies a settled or perpetual habitation;) Jannat al Mawa, the garden of abode; Jannat al Naim, the garden of pleasure; and the like: by which several appellations some understand so many different gardens, or at least places of different degrees of felicity (for they reckon no less than 100 such in all), the very meanest whereof will afford its inhabitants so many pleasures and delights, that one would conclude they must even sink under them, had not Mahomet declared that, in order to qualify the blessed for a full enjoyment of them, God will give to every one the abilities of 100 men.

6 God's absolute decree and predestination both of good and evil. The orthodox doctrine is, that whatever hath or shall come to pass in this world, whether it be good, or whether it be bad, proceedeth entirely from the divine will, and is irrevocably fixed and recorded from all eternity in the preserved table: God having secretly predetermined not only the adverse and prosperous fortune of every person in this world, in the most minute particulars, but also his faith or infidelity, his obedience or disobedience, and consequently his everlasting happiness or misery after death; which fate or predestination it is not possible by any foresight or wisdom to avoid.

Of this doctrine Mahomet makes great use in his Koran for the advancement of his designs; encouraging his followers to fight without fear and even desperately, for the propagation of their faith, by representing to them, that all their caution could not avert their inevitable destiny, or prolong their lives for a moment; and deterring them from disobeying or rejecting him as an impostor, by setting before them the danger they might thereby incur of being, by the just judgment of God, abandoned to seduction, hardness of heart, and a reprobate mind, as a punishment for their obstinancy.

II. *Religious Practice.*—Of this we shall only mention here the pilgrimage to Mecca, which is so necessary a point of practice, that, according to a tradition of Mahomet, he who dies without performing it may as well die a Jew or a Christian; and the same is expressly commanded in the Koran.

The temple of Mecca stands in the midst of the city, and is honoured with the title of Masjad al elharam, i. e. the sacred or inviolable temple. What is principally reverenced in this place, and gives sanctity to the whole, is a square stone building, called the CAABA; (see that article).

To this temple every Mahometan, who has health and means sufficient, ought, once at least in his life, to go on pilgrimage; nor are women excused from the performance of this duty. The pilgrims meet at different places near Mecca, according to the different parts from whence they come, during the months of Shawal and Dhu'lkaada being obliged to be there by the beginning o Dhu'lhajja; which month, as its name imports, is peculiarly set apart for the celebration of this solemnity.

At the place above mentioned the pilgrims properly commence such; when the men put on the Ibram or sacred habit, which consists only of two woollen wrappers, one wrapped about their middle to cover their privities, and the other thrown over their shoulders, having their heads bare, and a kind of slippers which cover neither the heel nor the instep, and so enter the sacred territory in their way to Mecca. While they have this habit on, they must neither hunt nor fowl, (though they are allowed to fish); which precept is so punctually observed, that they will not kill even a louse or flea if they find them on their bodies: there are some noxious animals, however, which they have permission to kill during the pilgrimage, as kites, ravens, scorpions, mice, and dogs given to bite. During the pilgrimage, it behoves a man to have a constant guard over his words and actions; to avoid all quarrelling or ill language, all converse with women, and all obscene discourse; and to apply his whole attention to the good work he is engaged in.

The pilgrims, being arrived at Mecca, immediately visit the temple; and then enter on the performance of the prescribed ceremonies, which consist chiefly in going in procession round the Caaba, in running between the mounts Safa and Merwa, in making the station on Mount Arafat, and slaying the victims, and shaving their heads in the valley of Mina.

In compassing the Caaba, which they do seven times, beginning at the corner where the black stone is fixed, they use a short quick pace the three first times they go round it, and a grave ordinary pace the four last, which, it is said, was ordered by Mahomet, that his followers might show themselves strong and active to cut off the hopes of the infidels, who gave out that the immoderate heats of Medina had rendered them weak. But the aforesaid quick pace they are not obliged to use every time they perform this piece of devotion, but only at some particular times. So often as they pass by the black stone, they either kiss it, or touch it with their hand, and kiss that.

The running between Safa and Merwa is also performed seven times, partly with a slow pace and partly running: for they walk gravely till they come to a place between two pillars; and there they run, and afterwards walk again; sometimes looking back, and sometimes stooping, like one who had lost something, to represent Hagar seeking water for her son: for the ceremony is said to be as ancient as her time

On the ninth of Dhu'lhajja, after morning prayer, the pilgrims leave the valley of Mina, whither they come the day before; and proceed in a tumultuous and rushing manner to Mount Arafat, where they stay to perform their devo-

tions till sunset: then they go to Mozdalifa, an oratory between Arafat and Mina; and there spend the night in prayer and reading the Koran. The next morning by day-break they visit al Masher al Karam, or the sacred monument; and, departing thence before sunrise, haste by Batn Mohasser to the valley of Mina, where they throw seven stones at three marks or pillars, in imitation of Abraham, who, meeting the devil in that place, and being by him disturbed in his devotions, or tempted to disobedience when he was going to sacrifice his son, was commanded by God to drive him away by throwing stones at him; though others pretend this rite to be as old as Adam, who also put the devil to flight in the same place, and by the same means.

This ceremony being over, on the same day, the tenth of Dhu'lhajja, the pilgrims slay their victims in the said valley of Mina; of which they and their friends eat part, and the rest is given to the poor. These victims must be either sheep, goats, kine, or camels: males, if of either of the two former kinds; and females, if of either of the latter; and of a fit age. The sacrifices being over, they shave their heads and cut their nails, burying them in the same place; after which the pilgrimage is looked on as completed: though they again visit the Caaba, to take their leave of that sacred building.

The rapid success which attended the propagation of this new religion was owing to causes that are plain and evident, and must remove or rather prevent our surprise, when they are attentively considered. The terror of Mahomet's arms, and the repeated victories which were gained by him and his successors, were, no doubt, the irresistible arguments that persuaded such multitudes to embrace his religion and submit to his dominion. Besides, his law was artfully and marvellously adapted to the corrupt nature of man; and, in a more particular manner, to the manners and opinions of the eastern nations, and the vices to which they were naturally addicted: for the articles of faith which it proposed were few in number, and extremely simple; and the duties it required were neither many nor difficult, nor such as were incompatible with the empire of appetites and passions. It is to be observed farther, that the gross ignorance, under which the Arabians, Syrians, Persians, and the greatest part of the eastern nations, laboured at this time, rendered many an easy prey to the artifice and eloquence of this bold adventurer. To these causes of the progress of Mahometanism, we may add the bitter dissensions and cruel animosities that reigned among the Christian sects, particularly the Greeks, Nestorians, Eutychians, and Monophysites; dissensions that filled a great part of the east with carnage, assassinations, and such detestable enormities as rendered the very name of Christianity odious to many. We might add here, that the Monophysites and Nestorians, full of resentment against the Greeks, from whom they had suffered the bitterest and most injurious treatment, assisted the Arabians in the conquest of several provinces, into which, of consequence, the religion of Mahomet was afterwards introduced. Other causes of the sudden progress of that religion will naturally occur to such as consider attentively its spirit and genius, and the state of the world at that time.

MAHOMETANS, those who believe in the religion and divine mission of Mahomet. See MAHOMET, MAHOMETANISM, and ALCORAN.

MAHRATTA. See MARHATTA.

MAHWAH, or MAWEE. In botany, an East Indian tree, so called by the natives of Bahar and the neighbouring countries, but of which the Shanscrit name is madhuca or madhudruma. According to lieut. C. Hamilton, by whom a very particular account of this tree is given in the Asiatic Researches, it is of the class of the polyandria monogynia of Linnéus, but of a genus not described by him.

The tree, when full grown, is about the size of a common mango, with a bushy head and oval leaves a little pointed; its roots spreading horizontally, are sunk but little in the earth; the trunk, which is often of a considerable thickness, rises seldom to any great height, without giving off branches; it is, however, not uncommon to see it shoot up clear to the length of eight or ten feet: the wood itself is moderately hard, fine grained, and of a reddish colour. By incision the tree affords a resinous gum from the bark.

The flowers are of a nature very extraordinary, "differing essentially (says Mr. Hamilton) from those of any other plant with which I am acquainted, as they have not, in any respect, the usual appearance of such, but rather resemble berries; and I, like many others, had long conceived them to be the fruit of the Mahwah." The tree drops its leaves in the month of February, and early in March these flowers begin to come out in clusters of thirty, forty, or fifty, from the extremity of every small branch; and, from this period till the latter end of April, as the flowers come to maturity (for they never open or expand), they continue falling off, with their antheræ, in the mornings, a little after sunrise; when they are gathered; and afterwards dried by an exposure of a few days in the sun: when thus prepared, they very much resemble a dried grape, both in taste and flavour. Immediately after the flowers drop off, fresh shoots are made for the new leaves, which soon make their appearance, coming presently to their full growth.

The fruit (properly so called) is of two sorts in shape; the one resembling a small walnut, the other somewhat larger and pointed: it is ripe towards the middle of May; and continues dropping from the tree till the whole has fallen which is generally about the beginning or towards the middle of June. The outer covering, or pericarp, which is of a soft texture, commonly bursts in the fall, so that the seeds are very easily squeezed out of it: the seeds are somewhat of the shape, but longer than an olive. These seeds are replete with a thick oil, of the consistence of butter or ghee, which is obtained by expression.

From this description it may easily be conceived, that the Mahwah tree and its productions are of singular and general use, especially in those dry and barren countries, which, from the nature of their situation, are not so well calculated for producing in plenty or perfection the other necessaries of life.

The corolla or flower, after being dried as before described, is eaten by the natives raw or dressed with their curries; and, when even simply boiled with rice, they afford a strengthening and wholesome nourishment. They are indeed, our author tells us, often applied to a less laudable purpose; for being fermented, they yield by distillation a strong spirit, which the people here sell so very cheap, that for one pice (about a halfpenny) may be purchased no less than a cutcha-seer (above a pint English), with which any man may get completely drunk. These flowers make an article of trade; being exported from this country to Patna, and elsewhere in no inconsiderable quantities.

The oil yielded by the fruit, as before mentioned, resembles ghee so much, that, being cheaper, the natives often mix it with that commodity. They use it the same as ghee in their victuals, and in the composition of some sorts of sweetmeats; and burn it in their lamps. It is also regarded as a salutary remedy, applied exteriorly to wounds and all cutaneous eruptions. It is at first of the consistence of common oil, but soon coagulates: after being kept for some time, it acquire a bitterish taste and rancid smell, which renders it somewhat less agreeable as an article of food: but this is an inconvenience which, by the oil being properly clarified and prepared at first, might be perhaps avoided. This oil is also exported both in its adulterated and original state to Patna and other parts of the low country. The gum has not been applied to any use; but might be collected in large quantities in the months of March and April, about the time the flowers come out.

MAIA, in fabulous history, the daughter of Atlas and Pleione. She was the mother of Mercury by Jupiter. She was one of the Pleiades, the most luminous of the seven sisters. (See PLEIADES.) Also, a surname of Cybele.

MAID. MA'IDEN. *s.* (mæꝺen, mæᵹꝺen, Saxon; *maegd*, Dutch.) 1. An unmarried woman; a virgin (*Dryden*). 2. A woman servant (*Prior*). 3. Female (*Leviticus*).

MAID. *s.* A species of skate fish.

MA'IDEN. *a.* 1. Consisting of virgins (*Addison*). 2. Fresh; new; unused; unpolluted (*Shakspeare*).

MAIDEN, an instrument for beheading criminals.

Of the use and form of this instrument Mr. Pennant gives the following account: "It seems to have been confined to the limits of the forest of Hardwick, or the 18 towns and hamlets within its precincts. The time when this custom took place is unknown; whether earl Warren, lord of this forest, might have established it among the sanguinary laws then in use against the invaders of the hunting rights, or whether it might not take place after the woollen manufactures at Halifax began to gain strength, is uncertain. The last is very probable; for the wild country around the town was inhabited by a lawless set, whose depredations on the cloth-tenters might soon stifle the efforts of infant industry. For the protection of trade, and for the greater terror of offenders by speedy execution, this custom seems to have been established, so as at last to receive the force of law, which was, 'That if a felon be taken within the liberty of the forest of Hardwick, with goods stolen out, or within the said precincts, either hand-habend, back-berand, or confession'd, to the value of thirteen pence halfpenny, he shall, after three market days or meeting days within the town of Halifax, next after such his apprehension, and being condemned, be taken to the gibbet, and there have his head cut from his body.'

"The offender had always a fair trial; for as soon as he was taken, he was brought to the lord's bailiff at Halifax; he was then exposed on the three markets (which here were held thrice in a week), placed in a stocks, with the goods stolen on his back, or, if the theft was of the cattle kind, they were placed by him; and this was done both to strike terror into others, and to produce new informations against him. The bailiff then summoned four freeholders of each town within the forest to form a jury. The felon and prosecutors were brought face to face; and the goods, the cow or horse, or whatsoever was stolen, produced. If he was found guilty, he was remanded to prison, had a week's time allowed for preparation, and then was conveyed to this spot, where his head was struck off by this machine. I should have premised, that if the criminal, either after apprehension, or in the way to execution, could escape out of the limits of the forest (part being close to the town), the bailiff had no farther power over him; but if he should be caught within the precincts at any time after, he was immediately executed on his former sentence.

"This privilege was very freely used during the reign of Elizabeth: the records before that time were lost. Twenty-five suffered in her reign, and at least twelve from 1623 to 1650; after which I believe the privilege was no more exerted.

"This machine of death is now destroyed; but I saw one of the same kind in a room under the parliament house at Edinburgh, where it was introduced by the regent Morton, who took a model of it as he passed through Halifax, and at length suffered by it himself. It is in form of a painter's easel, and about ten feet high: at four feet from the bottom is a cross bar on which the felon lays his head, which is kept down by another placed above. In the inner edges of the frames are grooves; in these is placed a sharp axe, with a vast weight of lead, supported at the very summit with a peg: to that peg is fastened a cord, which the executioner cutting, the axe falls, and does the affair effectually, without suffering the unhappy criminal to undergo a repetition of strokes, as has been the case in the common method. I must add, that if the sufferer is condemned for stealing a horse or a cow, the string is tied to the beast, which, on being whipped, pulls out the peg, and becomes the executioner." This apparatus is now in possession of the Scottish Antiquarian Society.

Maiden is also the name of a machine first used in Yorkshire, and since introduced into other places, for washing linen; consisting of a tub 19 inches high, and 27 in diameter at the top, in which the linen is put, with hot water and soap, to which is adapted a cover, fitting it very closely, and fastened to the tub by two wedges: through a hole in the middle of the cover passes an upright piece of wood, kept at a proper height by a peg above, and furnished with two handles, by which it is turned backward and forward: to the lower end of this upright piece is fastened a round piece of wood, in which are fixed several pieces, like cogs of a wheel. The operation of this machine is to make the linen pass and repass quick through the water.

Maiden hair, in botany. See Adiantum.

Maiden hair (Canada). Adiantum Canadense, in medicine, the adiantum pedatum of Linnéus. In common use in France, like the officinal adiantum in our own country, is a pectoral, and demulcent, and perhaps possessing superior virtues.

Maiden hair (English). See Adiantum.

Maiden hair tree. Ginkgo. Ginan itsio. The salisburia of the Linnean system. It is common to China and Japan, and bears a fruit about the size of a damask plum, containing a kernel resembling that of our apricot. It is these that make a part of our deserts at all public feasts and entertainments. They are said to promote digestion, and to cleanse the stomach and bowels. See Salisburia.

MA'IDENHEAD. Ma'idenhode. Ma'idenhood. *s.* (from *maiden.*) 1. Virginity; virginal purity; freedom from contamination (*Milton*). 2. Newness; freshness; uncontaminated state (*Wotton*).

Maidenhead, a town in Berkshire, governed by a mayor, with a market on Wednesday, and a good trade in malt, meal, and timber. It is seated on the Thames, over which is a bridge, 12 miles E by N. of Reading, and 26 W. by N. of London.

MAIDENOI, an island in the Pacific ocean, 36 miles long and nine broad. In the N.W. part of it native copper is found. Lon. 107. 10 E. Lat. 54. 40 N.

MAIDEN-RENTS, in our old writers, a noble paid by the tenants of some manors on their marriage. This was said to be given to the lord for his omitting the custom of marcheta, whereby he was to have the first night's lodging with his tenant's wife; but it seems more probably to have been a fine for a license to marry a daughter.

MA'IDHOOD. *s.* (from *maid.*) Virginity (*Shakspeare*).

MA'IDMARIAN. *s.* (*puer ludius*, Latin.) A kind of dance (*Temple*).

MA'IDPALE. *a.* (*maid* and *pale.*) Pale like a sick virgin (*Shakspeare*).

MAIDSE'RVANT. *s.* A female servant (*Swift*).

MAIDSTONE, a borough and the county-town of Kent, governed by a mayor, with a market on Thursday. It has a brisk trade in exporting the commodities of the county, particularly hops, of which there are numerous plantations around; here are likewise paper-mills, and a manufacture of linen. In 1801 the number of inhabitants was 8027. It is seated on the Medway, over which is a bridge, 20 miles W. of Canterbury, and 34 E.S.E. of London. Lon. 0. 38 E. Lat. 51. 19 N.

MAJE'STICAL. Maje'stic. *a.* (from *majesty.*) 1. August; having dignity; grand; imperial; regal; great of appearance (*Denham*). 2. Stately, pompous, splendid (*Hook.*). 3. Sublime; elevated; lofty (*Dryden*).

MAJE'STICALLY. *ad.* (from *majestical.*) With dignity; with grandeur (*Glanville*).

MAJESTY, a title given to kings, which frequently serves as a term of distinction. The word seems composed of the two Latin words, *major*, greater, and *status*, state. The emperor is called sacred majesty, imperial majesty, and Cæsarean majesty: the king of Hungary is styled his apostolic majesty. The king of Spain is termed his most catholic majesty: and the king of Portugal, his most faithful majesty. The king of France used to be called his most Christian majesty; and when he treated with the emperor, the word sacred was added: he was afterwards called simply, king of the French. Bonaparte assumed the title of emperor and king of France.—With respect to other kings, the name of the kingdom is added; as, his Britannic majesty, his Prussian majesty, &c. Formerly princes were more sparing in giving titles, and more modest in claiming them: before the reign of Charles V. the king of Spain had only the title of highness; and before that of Henry VIII. the kings of England were only addressed under the titles of grace and highness.

Under the Roman republic, the title majesty (*majestas*) belonged to the whole body of the people, and to the principal magistrates; so that to diminish or wound the majesty of the commonwealth, was to be wanting in respect to the state or to its ministers. But the power afterwards passing into the hands of a single person, the appellation of majesty was transferred to the emperor and the imperial family. Pliny compliments Trajan on his being contented with the title of greatness; and speaks very invidiously of those who affected that of majesty. And yet this last seems to be the most modest and just title that can be attributed to sovereigns, since it signifies no more than the royalty or sovereign power.

MAII INDUCTIO, an ancient custom for the priest and people of country-villages to go in procession to some adjoining wood on a May-day morning; and return in a kind of triumph, with a May-pole, boughs, flowers, garlands, and other tokens of the spring. This May-game, or rejoicing at the coming of the spring, was for a long time observed, and still is in some parts of England; but there was thought to be so much heathen vanity in it, that it was condemned and prohibited within the

diocese of Lincoln by the good old bishop Grosthead.

MAIL (*maille*), a term primarily applied to the meshes or holes in net-work.

MAIL (Coat of). See COAT. It is called also a habergeon. Anciently they also wore shirts of mail under the waistcoats, to serve as a defence against swords and poniards. We also read of gloves of mail.

MAIL, or MALL, also signifies a round ring of iron; whence the play of pall-mall, from *palla*, a ball, and *maille*, the round ring through which it is to pass.

MAIL, or MAILLE, in our old writers, a small kind of money. Silver halfpence were likewise termed mailles, 9 Henry V. By indenture in the mint, a pound weight of old sterling silver was to be coined into 360 sterlings or pennies, or 720 mails or half-pennies, or 1440 farthings. Hence the word mail was derived, which is now vulgarly used in Scotland to signify an annual rent.

MAIL, or MAILL, on ship-board, a square machine composed of a number of rings interwoven net-wise, and used for rubbing off the loose hemp which remains on lines or white cordage after it is made.

MAIL is likewise used for the leather bag wherein letters are carried by the post.

MAIL-COACHES. See COACH.

To MAIL. *v. a.* (from the noun.) 1. To arm defensively; to cover as with armour (*Shakspeare*). 2. To bundle in a wrapper (*Shakspeare*).

MAILCOTAY, a lofty fortress of Hindustan, in Mysore, and one of the most celebrated places of Hindu worship. The large temple is a square building of great dimensions, and the jewels belonging it are very valuable. Here, in 1772, Hyder was completely routed by the Mahrattas. It is 17 miles north of Seringapatam.

To MAIM. *v. a.* (*mehaigner*, to maim, old French.) To deprive of any necessary part; to cripple by loss of a limb (*Shakspeare*).

MAIM. *s.* (from the verb.) 1. Privation of some essential part; lameness by a wound or amputation (*Hooker*). 2. Inquiry; mischief (*Shaks.*). 3. Essential defect (*Hayw.*).

MAIM, MAIHEM, or MAYHEM, in law, a wound by which a person loses the use of a member that might have been a defence to him; as when a bone is broken, a foot, hand, or other member cut off, or an eye put out; though the cutting off an ear or nose, or breaking the hinder-teeth, was formerly held to be no maim. A maim by castration was anciently punished with death, and other maims with loss of member for member; but afterwards they were only punished by fine and imprisonment. It is now enacted by the statute 22 and 23 Car. II. that if any person, from malice aforethought, shall disable any limb or member of any of the king's subjects with an intent to disfigure him, the offender, with his aiders and abettors, shall be guilty of felony without benefit of clergy; though no such attainder shall corrupt the blood, or occasion forfeiture of lands, &c.

MAIMONIDES, MOSES, or MOSES THE SON OF MAIMON, a celebrated rabbi, called by the Jews the eagle of the doctors, was born of an illustrious family at Cordova in Spain, in 1131. The early part of his education was undertaken by his father, who afterwards placed him under the tuition of rabbi Joseph, the son of Megas, a person on whose profound learning he has bestowed the highest praise; and, according to Leo Africanus, he had also among his tutors the learned Arabians Ibn Thophail and Averroes. He is commonly named Moses Ægyptius, because he settled in Egypt, where he spent his whole life in quality of physician to the sultan. Here he opened a school, which was soon filled with pupils from all parts, from Alexandria and Damascus especially, whose proficiency under him spread his fame all over the world. He was no less eminent in philosophy, mathematics, and divinity, than in medicine. Casaubon affirms it may be truly said of him, as Pliny of old said of Diodorus Siculus, that "he was the first of his tribe who ceased to be a trifler." It would be tedious to enumerate all the works of Maimonides, some were written originally in Arabic, but are now extant only in Hebrew translations. "Those (says Collier) who desire to learn the doctrine and the canon law contained in the Talmud may read Maimonides's compendium of it in good Hebrew, in his book entitled Iad; wherein they will find great part of the fables and impertinences in the Talmud entirely discarded. But the More Nevochim is the most valued of all his works; designed to explain the obscure words, phrases, metaphors, &c. in scripture, which, when literally interpreted, have either no meaning or appear absurd.

MAINA, a seaport of European Turkey, in the Morea, which gives name to a district that lies between two bays of the Mediterranean sea. The inhabitants could never be subdued by the Turks, on account of their valour and their mountains. The town is seated on the bay of Coron, 40 miles S. by W. of Misitra. Lon. 22. 10 E. Lat. 36. 34 N.

MAINE, a district belonging to the state of Massachusets, 300 miles long and 100 broad; bounded on the N.W. by the high lands, which separate the rivers that flow into the St. Lawrence and those that flow into the Atlantic; on the E. by the river St. Croix, and a line drawn due N. from its source to the said high lands, which divides this territory from New Brunswick; on the S.E. by the Atlantic; and on the W. by New Hampshire. It is divided into five counties, York, Cumberland, Lincoln, Hancock, and Washington. The chief rivers are the Penobscot, Kennebec, Saco, Androscoggin, St. John, and St. Croix; and it has several small lakes. Though an elevated tract, it cannot be called mountainous, and a great proportion of the lands are arable and exceedingly fertile. Hops are the spontaneous

growth of this country. The trees are white pine, spruce, maple, beech, white and gray oak, and yellow birch; these, as ship timber, boards, and every species of split lumber, are the principal exports of the country. The heat in summer is intense, and the cold in winter extreme; all the lakes and rivers are usually passable on ice, from Christmas till the middle of March. Portland is the capital.

MAINE, a late province of France, bounded on the N. by Normandy, E. by Orleanois, S. by Touraine and Anjou, and W. by Bretagn. It now forms the departments of Mayenne and Sarte.

MAINE, a river of Germany, which rises in Franconia, flows by Bamberg, Wurtzburg, Aschaffenburg, Hanau, and Frankfort, and joins the Rhine a little above Mentz.

MAINLAND, the largest of the Shetland isles, 60 miles long and in some places 16 broad; but it projects into the sea with many irregular promontories, and is indented by numerous bays and harbours. The face of the country exhibits a prospect of black craggy mountains and marshy plains, interspersed with some verdant spots, which appear smooth and fertile. Neither tree nor shrub is to be seen, except the juniper and the heath. The mountains abound with various kinds of game. Lofty cliffs, impending over the ocean, are the haunts of eagles, falcons, and ravens. The deep caverns underneath shelter seals and otters; and to the winding bays resort swans, geese, scarfs, and other aquatic birds. The seas abound with cod, turbot, and haddock; and, at certain seasons, with shoals of herrings. Lobsters, oysters, muscles, &c. are also plentiful. The hills are covered with black-cattle and sheep of a small breed; the horses are also of a diminutive size, but remarkably strong, and called Shetland ponies. The rivulets and lakes abound with salmon, trout, &c. No mines have been wrought, but there are visible appearances of various metallic ores. The inhabitants are hardy, docile, and ingenious. They manufacture linen and woollen cloth for their own use; and worsted stockings, some of fine texture and great value for exportation; but their principal occupation is fishing. Lerwick is the capital.

MAINLAND, the principal of the Orkney isles. See POMONA.

MA'INLAND. *s.* (*main* and *land.*) Continent (*Spenser*).

MA'INLY. *ad.* (from *main.*) 1. Chiefly; principally (*Woodward*). 2. Greatly; hugely (*Bacon*).

MA'INMAST. *s.* (*main* and *mast.*) The chief or middle mast (*Dryden*).

MAINOUR, MANOUR, or MEINOUR. (from the French, *manier*, i.e. *manu tractare.*) In a legal sense denotes the thing that a thief taketh away or stealeth: as to be taken with the mainour (*Pl. Cor.* fol. 179.), is to be taken with the thing stolen about him: and again (fol. 194.) it was presented, that a thief was delivered to the sheriff or viscount, together with the mainour: and again (fol. 186.), if a man be indicted, that he feloniously stole the goods of another, where, in truth, they are his own goods, and the goods be brought into the court as the mainour; and if it be demanded of him, what he saith to the goods, and he disclaims them; though he be acquitted of the felony, he shall lose the goods: and again (fol. 149.), if the defendant were taken with the mainour, and the mainour be carried to the court, they, in ancient times, would arraign him upon the mainour, without any appeal or indictment. (*Cowel*).

MA'INPERNABLE. *a.* Bailable; that may be admitted to give surety.

MA'INPERNOR. *s.* Surety; bail (*Davies*).

MA'INPRISE. *s.* (*main* and *pris*, French.) Delivery into the custody of a friend, upon security given for appearance; bail (*Davies*).

To MA'INPRISE. *v. a.* To bail.

MA'INSAIL. *s.* (*main* and *sail.*) The sail of the mainmast (*Acts*).

MA'INSHEET. *s* (*main* and *sheet.*) The sheet or sail of the mainmast (*Dryden*).

To MAINTA'IN. *v. a.* (*maintenir*, Fr.) 1. To preserve, to keep (*Harvey*). 2. To defend; to hold out (*Grew*). 3. To vindicate; to justify (*Shakspeare*). 4. To continue; to keep up (*Dryden*) 5. To keep up; to support the expence of (*Shakspeare*). 6. To support with the conveniences of life (*South*). 7. To preserve from failure (*Blackmore*).

To MAINTA'IN. *v. a.* To support by argument; to assert as a tenet (*Dryden*).

MAINTA'INABLE. *a.* (from *maintain.*) Defensible; justifiable (*Hayward.*)

MAINTA'INER. *s.* (from *maintain.*) Supporter; cherisher (*Spenser*).

MA'INTENANCE. *s.* (*maintenant*, Fr.) 1. Supply of the necessaries of life; sustenance; sustentation (*Hooker*). 2. Support; protection; defence (*Spenser*). 3. Continuance; security from failure (*South*).

MAINTENANCE, in law, bears a near relation to barretry; being an officious intermeddling in a suit that no way belongs to one, by maintaining or assisting either party with money or otherwise, to prosecute or defend it: a practice that was greatly encouraged by the first introduction of uses. This is an offence against public justice, as it keeps alive strife and contention, and perverts the remedial process of the law into an engine of oppression. And therefore, by the Roman law, it was a species of the *crimen falsi*, to enter into any confederacy, or do any act to support another's law-suit, by money, witnesses, or patronage. A man may, however, maintain the suit of his near kinsman, servant, or poor neighbour, out of charity and compassion, with impunity. Otherwise the punishment by common law is fine and imprisonment; and by the statute 32 Henry VIII. c. 9. a forfeiture of 10l.

MAINTENON (Frances d'Aubigné, madame de), a famous French lady, born 1635, in the prison of Niort, where her father was confined for some ill conduct against Richelieu. The father, after his enlargement, took all his family, 1639, to America, and settled at Mar-

tiniquo, where he ruined himself by gaming. On his death, in 1646, the widow returned to France, leaving her daughter as a pledge in the hands of her creditors; but the child was soon after sent after the mother, and taken under the protection of her aunt, madame Villette, at Poictou. As, however, she had been brought up a protestant, she was by artifice converted to the Roman catholic religion. In 1651 she formed an union with the abbé Scarron, who was old and deformed, but witty, and the favourite of the court. On the death of her husband, in 1660, her distresses returned, and she solicited in vain for a small pension from the court. In 1671, however, she was appointed over the education of the young duke de Maine, the king's son, by his mistress, madame de Montespan, and from this situation arose her greatness. The king saw her, and was captivated with her manners and person, and in 1679 he purchased for her the estate of Maintenon, from which she derived her new title. In this dangerous elevation, madame Maintenon conducted herself with great propriety; she never interfered with the politics of the court, her sole wish was to please the king, and in this she so happily succeeded, that though she was two years older than himself, he married her privately, 1685. Now raised from a mistress to a wife, a secret, however, which was never revealed, she applied herself more frequently to acts of religion and piety, and founded an abbey for women of quality, afterwards called St. Cyr, of which she called herself the superior. She also prevailed upon Racine, now become a courtier, to write a tragedy upon some striking subject from the bible, and in consequence of this he produced his Esther, and also his Athaliah, which were originally acted by the religious devotees of St. Cyr. Upon the king's death, in 1715, she retired to privacy at St. Cyr, and long fatigued with the splendour of greatness, she acknowledged the emptiness of human distinction, and ended her days in penitence and devotion. She died 1719. Some have accused her of causing the revocation of the edict of Nantes, but it is certain that she extended her protection to those who where persecuted for their religion. The happiest part of her life was spent, says Voltaire, in the company of the buffoon Scarron; and in a letter to a friend, she declares that her grandeur was productive only of melancholy, and that though courted, flattered, and admired, she felt in her mind a dismal vacuity. Some of her letters have been published.

MA'INTOP. *s.* (*main* and *top.*) The top of the mainmast (*Addison*).

MA'INYARD. *s.* (*main* and *yard.*) The yard of the mainmast (*Arbuthnot*).

MA'JOR. *a.* (*major*, Lat.) 1. Greater in number, quantity, or extent. 2. Greater in dignity (*Shakspeare*).

MA'JOR. *s.* 1. The officer above the captain; the lowest field officer. 2. A mayor or head officer of a town. 3. The first proposition of a syllogism, containing some generality (*Boyle*). 4. MAJOR-*general.* The general officer of the second rank (*Tatler*) 5. MAJOR-*domo.* One who holds occasionally the place of master of the house.

MAJOR, in the art of war, the name of several officers of very different ranks and functions.

Major-general. See GENERAL.

Major of a regiment of foot, the next officer to the lieutenant-colonel, generally promoted from the eldest captain: he is to take care that the regiment be well exercised, to see it march in good order, and to rally it in case of being broke in action: he is the only officer among the infantry that is allowed to be on horseback in time of action, that he may the more readily execute the colonel's orders.

Major of a regiment of horse, as well as foot, ought to be a man of honour, integrity, understanding, courage, activity, experience, and address: he should be master of arithmetic, and keep a detail of the regiment in every particular: he should be skilled in horsemanship, and ever attentive to his business: one of his principal functions is, to keep an exact roster of the officers for duty: he should have a perfect knowledge in all the military evolutions, as he is obliged by his post to instruct others, &c.

Town-major, the third officer in order in a garrison, and next to the deputy-governor. He should understand fortification, and has a particular charge of the guards, rounds, patroles, and centinels.

Brigade-major, is a particular officer appointed for that purpose only in camp: he goes every day to head-quarters to receive orders from the adjutant-general: there he writes exactly whatever is dictated to him: from thence he goes and gives the orders, at the place appointed for that purpose, to the different majors or adjutants of the regiments which compose that brigade, and regulates with them the number of officers and men which each are to furnish for the duty of the army; taking care to keep an exact roster, that one may not give more than another, and that each march in their tour: in short, the major of brigade is charged with the particular detail in his own brigade, in much the same way as the adjutant-general is charged with the general detail of the duty of the army He sends every morning to the adjutant-general an exact return, by battalion and company, of the men of his brigade missing at the retreat, or a report expressing that none are absent: he also mentions the officers absent with or without leave.

Major of artillery, is also the next officer to the lieutenant-colonel. His post is very laborious, as the whole detail of the corps particularly rests with him; and for this reason all the non-commissioned officers are subordinate to him, as his title of serjeant-major imports: in this quality they must render him an exact account of every thing which comes to their knowledge, either regarding the duty or wants of the artillery and soldiers. He should possess a perfect knowledge of the power of artillery,

together with all its evolutions. In the field he goes daily to receive orders from the brigade-major, and communicates them with the parole to his superiors, and then dictates them to the adjutant. He should be a very good mathematician, and be well acquainted with every thing belonging to the train of artillery, &c.

Major of engineers, commonly with us called sub-director, should be very well skilled in military architecture, fortification, gunnery, and mining. He should know how to fortify in the field, to attack and defend all sorts of posts, and to conduct the works in a siege, &c. See ENGINEER.

Serjeant-major, is a non-commissioned officer, of great merit and capacity, subordinate to the adjutant as he is to the major. See SERJEANT.

Drum-major, is not only the first drummer in the regiment, but has the same authority over his drummers as the corporal has over his squad. He instructs them in their different beats; is daily at orders with the serjeants, to know the number of drummers for duty. He marches at their head when they beat in a body. In the day of battle, or at exercise, he must be very attentive to the orders given him, that he may regulate his beats according to the movements ordered.

Fife-major, is he that plays the best on that instrument, and has the same authority over the fifers as the drum-major has over the drummers. He teaches them their duty, and appoints them for guards, &c.

MAJOR, in law, a person who is of age to manage his own affairs. By the civil law a man is not a major till the age of 25 years; in England, he is a major at 21, as in Normandy at 20.

MAJOR, in logic, is understood of the first proposition of a regular syllogism. It is called major, because it has a more extensive sense than the minor proposition, as containing the principal term. See LOGIC.

MAJOR and MINOR, in music, are applied to concords which differ from each other by a semi-tone. See CONCORD.

MAJOR TONE is the difference between the fifth and fourth; and major semi-tone the difference between the major fourth and the third. The major tone surpasses the minor by a comma.

MAJOR-DOMO, an Italian term, frequently used to signify a steward or master of the household.

MAJORANA. (*majorana*, corrupted from *majorano quod mense Maiæ florcit*, because it flowers in May.) Sweet marjoram. Origanum majorana of Linnéus. Orig. foliis ovatis obtusis, spicis subrotundis compactis pubescentibus. Class and order didynamia gymnospermia. This has been long cultivated in ou gardens, and is in frequent use for culinary purposes. The leaves and tops have a pleasant smell, and a moderately warm, aromatic, bitterish taste. The medicinal qualities of the plant are similar to those of the wild plant (see ORIGANUM) but being much more fragrant, it is thought to be more cephalic. It was formerly directed in the pulvis sternutatorius by the London and Edinburgh pharmacopœias with a view to the agreeable odour which it diffuses to the asarabacca, rather than to its errhine power, which is very inconsiderable. In its recent state it is said to have been successfully applied to schirrous tumours of the breast.

MAJORANA SYRIACA. In medicine. See MARUM SYRIACUM.

MAJORA'TION. *s.* (from *major.*) Increase; enlargement (*Bacon.*)

MAJO'RITY. *s.* (from *major.*) 1. The state of being greater (*Grew*). The greater number (*Addison*). 3. Ancestry (*Brown*). 4. Full age; end of minority (*Davies*). 5. First rank: obsolete (*Shaks.*). 6. The office of a major.

MAIRAN (Jean-Jacques d'Ortous de), descended from a noble family at Besiers, was born in that city in 1678, and died at Paris of a defluxion on the lungs on the 20th of February 1771, at the age of 93. He was one of the most illustrious members of the Academy of Sciences and of the French Academy. Being early connected with the former society, he, in the year 1741, succeeded Fontenelle in the office of secretary. This station he filled with the most distinguished success till the year 1744: and, like his predecessor, possessed the faculty of placing the most abstract subjects in the clearest light; a talent which is very rare, but which appears conspicuous in all his works. The chief of them are, 1. Dissertation sur la Glace, the last edition of which was printed in 1749, 12mo. This excellent little tract has been translated into German and Italian. 2. Dissertation sur la cause de la lumiere des Phosphores, 1717, 12mo. 3. Traité historique et physique de l'Aurore Boreale, first published in 12mo, 1733, and afterwards much enlarged and printed in 4to, in 1754. The system embraced by the author is liable to be controverted; but the book displays great taste and erudition. 4. Lettre au Pere Parennin, contenant diverses questions sur la Chine, 12mo. This is a very curious work, and is full of that philosophical spirit which characterizes the author's other publications. 5. A great number of papers in the memoirs of the Academy of Sciences (since 1719), of which he published some volumes. 6. Several Dissertations on particular subjects, which form only small pamphlets. 7. The Eloges of the Academicians of the Academy of Sciences, who died in 1741, 1742, 1743, in 12mo, 1747. Without imitating Fontenelle, the author attained almost equal excellence by his talent of discriminating characters, appreciating their worth, and giving them their due share of praise, without at the same time concealing their defects.

Mairan's reputation extended itself into foreign countries. He was a member of the Imperial Academy at Petersburgh, of the Royal Academy of London, of the Institution at Bologna, of the Royal Societies of Edinburgh and Upsal, &c. The gentleness and sweetness of his manners made him be considered as a per-

fect model of the social virtues. He possessed that amiable politeness, that agreeable gaiety, and that steady firmness, which never fail to procure love and esteem. But we must add, says M. Saverien, that every thing had a reference to himself; self-love and a regard to his own reputation were the motives of all his actions. He was deeply affected with censure or applause, and yet he had many friends. Uniting much gentleness of disposition to an ingenious and agreeable expression of contenance, he possessed the art of insinuating himself into the good graces of others, so as to pave the way to elevation and success. He was honoured with protection and particular marks of regard by the duke of Orleans the regent, who bequeathed to him his watch in his will. The prince of Conti loaded him with favours; and the chancellor Daguesseau, observing in him great originality and ingenuity of thought, appointed him president of the Journal des Sçavans: a station which he filled very much to the satisfaction of the public and of the learned. The private and selfish views imputed to him by M. Saverien never made him deficient in what was due to the strictest probity. An expression of his is remembered, which could have proceeded only from sentiment; "An honest man (said he) is one whose blood is refreshed with the recital of a good action." He was ready at repartee. One day he happened to be in company with a gentleman of the gown, and to differ with him in opinion upon some point which had no more connexion with jurisprudence than with geometry "Sir (said the magistrate, who supposed that a learned man was a perfect idiot out of his own sphere), we are not now talking of Euclid or Archimedes." "No, nor of Cujas nor Barthole!" replied the academician.

MAJORCA, an island of Spain, 60 miles long and 45 broad, situate in the Mediterranean sea, between Ivica and Minorca. The whole coast is lined with strong towers. The N.W. part is mountainous; the rest produces good corn, olive-trees, fine honey, and delicate wine. It has no rivers, though there are a great many fine fountains and wells. The inhabitants are robust and lively, and make good sailors.

MAJORCA, a strong city, capital of the island of the same name, and a bishop's see. The public squares, the cathedral, and the royal palace, are magnificent. It contains 4000 houses, built after the antique manner; a university, more ancient than celebrated; and 22 churches, besides the cathedral. The harbour is extremely good. It was taken by the English in 1706, and retaken in 1715. It is seated on the S.W. side of the island. Lon. 2. 30 E. Lat. 39. 35 N.

MAITLAND (John), lord of Thyrlestane, was born 1545. He was educated in Scotland, practised with such success that James VI. made him his secretary of state, 1584, and the next year lord chancellor of the kingdom. He attended his master to Denmark in 1589, and died 1595. He wrote Epigrammata Latina, &c.

MAITLAND (William), a Scotch antiquarian, born in Forfarshire, 1693. From a hair merchant he became a man of letters, and settled in London, where he published his History of London, folio, 1739. In 1753 appeared his History of Edinburgh, folio, and in 1757 his History and Antiquities of Scotland, 3 vols. folio. He died at Montrose, aged 64.

MAITTAIRE (Michael), a learned English writer, was born in 1668. Dr. South, canon of Christ-church, made him a student of that house, where he took the degree of M. A. March 23, 1696. From 1695 till 1699 he was second master of Westminster school; which was afterwards indebted to him for Græcæ Linguæ Dialecti, in usum Scholæ Westmonasteriensis, 1706, 8vo; and for the English Grammar, applied to, and exemplified in, the English Tongue, 1712, 8vo. In 1711, he published Remarks on Mr. Whiston's Account of the Convocation's proceedings with relation to himself, in a Letter to the right reverend Father in God George Lord Bishop of Bath and Wells, 8vo; also An Essay against Arianism, and some other Heresies; or a Reply to Mr. William Whiston's Historical Preface and Appendix to his Primitive Christianity revived, 8vo. In 1709 he gave the first specimen of his great skill in typographical antiquities, by publishing Stephanorum Historia, vitas ipsorum ac libros complectens, 8vo; which was followed in 1717 by Historia Typographorum aliquot Parisiensium, vitas et libros complectens, 8vo. In 1719, Annales Typographici ab artis inventæ origine ad annum MD, 4to. The second volume, divided into two parts, and continued to the year 1536, was published at the Hague in 1702; introduced by a letter of John Toland, under the title of Conjectura verisimilis de prima Typographiæ Inventione. The third volume, from the same press, in two parts, continued to 1557, and (by an Appendix) to 1664, in 1725. In 1733 was published at Amsterdam what is usually considered as the fourth volume, under the title of Annales Typographici ab artis inventæ origine, ad annum MDCLXIV, opera Mich. Maittaire, A.M. editio nova, auctior et emendatior; tomi primi pars posterior. In 1741 the work was closed at London, by Annalium Typographicorum Tomus quintus et ultimus, indicem in tomos quatuor præeuntes complectens; divided, like the two preceeding volumes, into two parts. In the intermediate years, Mr. Maittaire was diligently employed on various works of value. In 1713 he published by subscription Opera et Fragmenta Veterum Poëtarum, 1713, two volumes in folio: the title of some copies is dated 1721. In 1714, he was the editor of a Greek testament, in 2 vols. The Latin writers, which he published separately, most of them with good indexes, came out in the following order: In 1713, Christus Patiens; Justin; Lucretius; Phædrus; Sallust; Terence. In 1715, Catullus; Tibullus; Propertius; Cornelius Nepos. Florus; Horace; Juvenal; Ovid, 3 vols; Virgil. In 1711, Cæsar's Commenta-

ries; Martial; Quintus Curtius. In 1718 and 1725, Velleius Paterculus. In 1719, Lucan. In 1720, Bonefonii Carmina. In 1721 he published, Batrachomyomachia, Græcè, ad veterum exemplarium fidem recusa; glossa Græca, variantibus lectionibus, versionibus Latinis, commentariis et indicibus, illustrata, 8vo. In 1722, Miscellanea Græcorum aliquot Scriptorum Carmina, cum versione Latina et notis, 4to. In 1724 he compiled, at the request of Dr. John Freind (at whose expence it was printed), an index to the works of Aretæus, to accompany the splendid folio edition of that author in 1723. In 1725 he published an excellent edition of Anacreon in 4to, of which no more than 100 copies were printed, and the few errata in each copy corrected by his own hand. A second edition of the like number was printed in 1741, with six copies on fine writing paper. In 1726 he published Petri Petiti Medici Parisiensis in tres priores Aretæi Cappadocis Libros Commentarii, nunc primum editi, 4to. This learned commentary was found among the papers of Grævius. From 1728 to 1733 he was employed in publishing Marmorum Arundelianorum, Seldenianorum, aliorumque Academiæ Oxoniensi donatorum, una cum Commentariis et Indice, editio secunda, folio; to which an Appendix was printed in 1733. Epistola D. Mich. Maittaire ad D. P. Des Maizeaux, in qua Indicis in Annales Typographicos methodus explicatur, &c. is printed in The Present State of the Republic of Letters, August 1733, p. 142. The life of Robert Stephens in Latin, revised and corrected by the author, with a new and complete list of his works, is prefixed to the improved edition of R. Stephens's Thesaurus, 4 vols. in folio, in 1734. In 1736 appeared Antiquæ Inscriptiones duæ, folio; being a commentary on two large copper tables discovered near Heraclea, in the bay of Tarentum. In 1738 were printed at the Hague Græcæ Linguæ Dialecti in Scholæ Regiæ Westmonasteriensis usum recogniti, opera Mich. Maittaire. In 1739 he addressed to the empress of Russia a small Latin poem, under the title of Carmen Epinicium Augustissimæ Russorum Imperatrici sacrum. His name not having been printed in the title-page, it is not so generally known that he was editor of Plutarch's Apophthegmata, 1741, 4to. The last publication of Mr. Maittaire was a volume of poems in 4to, 1742, under the title of Senilia, sive Poetica aliquot in argumentis varii generis tentamnia. Mr. Maittaire died in 1747, aged 79. His valuable library, which had been 50 years collecting, was sold by auction by Messrs. Cock and Langford, at the close of the same year, and the beginning of the following, taking up in all 44 nights. Mr. Maittaire, it may be added, was patronized by the first earl of Oxford, both before and after that gentleman's elevation to the peerage, and continued a favourite with his son the second earl. He was also Latin tutor to Mr. Stanhope, the earl of Chesterfield's favourite son.

MAIZE, in botany. See ZEA.

To MAKE. *v. a.* (macan, Saxon; *machen*, German; *maiken*, Dutch.) 1. To create (*Genesis*). 2. To form of materials (*Holder*). 3. To compose (*Waller*). 4. To form by art what is not natural (*Spenser*). 5. To produce or effect as the agent (*Hooker*). 6. To produce as a cause (*Proverbs*). 7. To do; to perform; to practise; to use in action (*Dryden*). 8. To cause to have any quality (*Clarendon*). 9. To bring into any state or condition (*Job*). 10. To form; to settle (*Rowe*). 11. To hold; to keep (*Dryden*). 12. To secure from distress; to establish in riches or happiness (*Shakspeare*). 13. To suffer; to incur (*Bacon*). 14. To commit (*Dryden*). 15. To compel; to force; to constrain (*Locke*). 16. To intend; to purpose to do (*Dryden*). 17. To raise as profit from any thing (*Shak.*). 18. To reach; to tend to; to arrive at (*Dryden*). 19. To gain (*Milton*). 20. To force; to gain by force (*Temple*). 21. To exhibit (*Luke*). 22. To pay; to give (*Leviticus*). 23. To put; to place (*Bacon*). 24. To turn to some use (*Dryden*). 25. To incline to; to dispose to (*Brown*). 26. To effect as an argument (*Hooker*). 27. To represent; to show (*Baker*). 28. To constitute (*Locke*). 29. To amount to (*Galatians*). 30. To mould; to form (*Bacon*). 31. *To* MAKE *away*. To kill; to destroy (*Sidney*). 32. *To* MAKE *away*. To transfer (*Waller*). 33. *To* MAKE *account*. To reckon; to believe (*Bacon*). 34. *To* MAKE *account of*. To esteem; to regard. 35. *To* MAKE *free with*. To treat without ceremony (*Dunciad*). 36. *To* MAKE *good*. To maintain; to defend; to justify (*Knoll.*). 37. *To* MAKE *good*. To fulfil; to accomplish (*Shakspeare*). 38. *To* MAKE *light of*. To consider as of no consequence (*Matthew*). 39. *To* MAKE *love*. To court; to play the gallant (*Addison*). 40. *To* MAKE *merry*. To feast; to partake of an entertainment (*Shakspeare*). 41. *To* MAKE *much of*. To cherish; to foster (*Temple*). 42. *To* MAKE *of*. *What to make of*, is, how to understand (*Addison*). 43. *To* MAKE *of*. To produce from; to effect (*Addison*). 44. *To* MAKE *of*. To consider; to account; to esteem (*Dryden*). 45. *To* MAKE *of*. To cherish; to foster. 46. *To* MAKE *over*. To settle in the hands of trustees (*Hudibras*). 47. *To* MAKE *over*. To transfer (*Hammond*). 48. *To* MAKE *out*. To clear; to explain; to clear one's self (*Arb.*). 49. *To* MAKE *out*. To prove; to evince (*Swift*). 50. *To* MAKE *sure of*. To consider as certain (*Dryden*). 51. *To* MAKE *sure of*. To secure to one's possession (*Dryden*). 52. *To* MAKE *up*. To get together (*Locke*). 53. *To* MAKE *up*. To reconcile (*Shakspeare*). 54. *To* MAKE *up*. To repair (*Ezekiel*). 55. *To* MAKE *up*. To compose, as ingredients (*South*). 56. *To* MAKE *up*. To shape (*Arbuthnot*). 57. *To* MAKE *up*. To supply (*Hooker*). 58. *To* MAKE *up*. To compensate (*Atterbury*). 59. *To* MAKE *up*. To adjust (*Rogers*). 60. *To* MAKE *up*. To accomplish; to conclude; to complete (*Locke*).

To MAKE. *v. n.* 1. To tend; to travel; to

go any way (*Shakspeare*). 2. To contribute; to have effect (*Swift*). 3. To operate; to act as a proof of argument, or cause (*Hooker. Dryden*). 4. To show; to appear; to carry appearance (*Arbuthnot*). 5. *To* MAKE *away with*. To destroy; to kill; to make away (*Addison*). 6. *To* MAKE *for*. To advantage; to favour (*Bacon*). 7. *To* MAKE *up for*. To compensate; to be instead (*Swift*). 8. *To* MAKE *with*. To concur with (*Hooker*).

MAKE. *s.* (from the verb.) Form; structure; nature (*Glanville*).

MAKE. *s.* (maca, Saxon.) Companion; favourite friend (*Ben Jonson*).

MA'KEBATE. *s.* (*make* and *debate*.) Breeder of quarrels (*Sidney*).

MA'KER. *s.* (from *make*.) 1. The Creator (*Milton*). 2. One who makes any thing (*Pope*). 3. One who sets any thing in its proper state (*Ascham*).

MA'KEPEACE. *s.* (*make* and *peace*.) Peace-maker; reconciler (*Shakspeare*).

MA'KEWEIGHT *s.* (*make* and *weight*.) Any small thing thrown in to make up weight (*Philips*).

MAKE, in zoology. See LEMUR.

MALABAR, the name given to a great part of the west coast of the peninsula of Hindustan on this side of the Ganges, extending from the kingdom of Baglala to Cape Comorin, or from the north extremity of the kingdom of Canara as far as Cape Comorin, and lying between 9° and 14° N. lat. It is bounded by the mountains of Balagate on the east; by Deccan on the north; and on the west and south is washed by the Indian sea.

MALABAR PLUM. This fruit, which is the produce of the Eugenia jambos, smells, when ripe, like roses. On the coast of Malabar, where the tree grows plentifully, these plums are in great esteem. They are not only eaten fresh from the trees, but are preserved in sugar, so as to be rendered eatable all the year. Of the flowers a conserve was formerly prepared, which was used in medicine as a mild adstringent.

MALABATHRUM. (μαλαβαθρον: from Malabar in India, whence it was brought, and *betre*, a leaf, Ind.) The leaf of the tree, the bark of which is called cassia. See CASSIA LIGNEA.

MALACA, in ancient geography, surnamed Fœderatorum by Pliny; a maritime town of Bætica: a Carthaginian colony according to Strabo; so called from Malach, signifying salt; a place noted for pickled or salted meat. Now Malaga.

MALACCA, the most southerly part of the great peninsula beyond the Ganges, is about 600 miles in length, and contains a kingdom of the same name. It is bounded by the kingdom of Siam on the north; by the bay of Siam and the Indian ocean on the east; and by the straits of Malacca, which separate it from the island of Sumatra, on the south-west. This country is more to the south than any other in the East Indies; and comprehends the towns and kingdoms of Patan, Pahan, Igohor, Pera, Queda, Borkelon, Ligor; and to the north the town and kingdom of Tanassery, where the Portuguese formerly carried on a great trade. This last either does or did belong to the king of Siam. The people of Malacca are in general subject to the Dutch, who possess all the strong places on the coasts, and compel them to trade on their own terms, excluding all other nations of Europe from having any commerce with the natives.

The Malays are governed by feudal laws. A chief, who has the title of king or sultan, issues his commands to his great vassals, who have other vassals in subjection to them in a similar manner. A small part of the nation live independent, under the title of oramcai or noble, and sell their services to those who pay them best; while the body of the nation is composed of slaves, and live in perpetual servitude.

The country possessed by the Malays is in general very fertile. It abounds with odoriferous woods, such as the aloes, the sandal, and cassia. The ground is covered with flowers of the greatest fragrance, of which there is a perpetual succession throughout the year. There are abundance of mines of the most precious metals, said to be richer even than those of Brazil or Peru, and in some places are mines of diamonds. The sea also abounds with excellent fish, together with ambergrise, pearls, and those delicate birds-nests so much in request in China, formed in the rocks with the spawn of fishes and the foam of the sea, by a species of small-sized swallow peculiar to those seas. These are of such an exquisite flavour, that the Chinese for a long time purchased them for their weight in gold, and still buy them at an excessive price.

Notwithstanding all this plenty, however, the Malays are miserable. The culture of the lands, abandoned to slaves, is fallen into contempt. These wretched labourers, dragged incessantly from their rustic employments by their restless masters, who delight in war and maritime enterprises, have never time or resolution to give the necessary attention to the labouring of their grounds; of consequence the lands for the most part are uncultivated, and produce no kind of grain for the subsistence of the inhabitants. The sago tree indeed supplies in part the defect of grain. It is a species of the palm tree, which grows naturally in the woods to the height of about 20 or 30 feet; its circumference being sometimes from five to six. Its ligneous bark is about an inch in thickness, and covers a multitude of long fibres, which being interwoven one with another envelope a mass of a gummy kind of meal. As soon as this tree is ripe, a whitish dust, which transpires through the pores of the leaves, and adheres to their extremities, indicates that the trees are in a state of maturity. The Malays then cut them down near the root, and divide them into several sections, which they split into quarters: they then scoop out the mass of mealy substance, which is enve-

loped by and adheres to the fibres; they dilute it in pure water, and then pass it through a straining bag of fine cloth, in order to separate it from the fibres. When this paste has lost part of its moisture by evaporation, the Malays throw it into a kind of earthen vessel of different shapes, where they allow it to dry and harden. This paste is wholesome, nourishing food, and preserves for many years.

MALACCA, the capital of the country of the same name, is situated in a flat country close to the sea. The walls and fortifications are founded on a solid rock, and are carried up to a great height; the lower part of them is washed by the sea at every tide, and on the land-side is a wide canal or ditch, cut from the sea to the river, which makes it an island. In 1641 it was taken from the Portuguese by the Dutch, since which time it has continued in their possession. In this city there are a great many broad streets; but they are very badly paved. The houses are tolerably well built, and some of them have gardens behind or on one side. The inhabitants consist of a few Dutch, many Malayans, Moors, Chinese, and other Indians, who are kept in awe by a fortress, which is separated from the city by a river, and by good walls and bastions, as well as by strong gates, and a drawbridge that is on the eastern side. The city is well situated for trade and navigation. Lon. 102. 2 E. Lat. 2. 12 N.

MALACCA BEAN. See ANACARDIUM ORIENTALE.

MALACHI, or the prophecy of Malachi, a canonical book of the Old Testament, and the last of the 12 lesser prophets. Malachi prophesied about 300 years before Christ, reproving the Jews for their wickedness after their return from Babylon, charging them with rebellion, sacrilege, adultery, profaneness, and infidelity; and condemning the priests for being scandalously careless in their ministry; at the same time not forgetting to encourage the pious few, who, in that corrupt age, maintained their integrity. This prophet distinctly points at the Messiah, who was suddenly to come to his temple, and to be introduced by Elijah the prophet, that is, John the Baptist, who came in the spirit and power of Elias or Elijah.

MALACHITE. (*malachites*, from μαλαχιτη, the mallow, so called in consequence of its resemblance to this plant.) A green copper ore, or carbonat of copper, exhibiting several varieties. See CUPRUM.

MALACHON, in botany, a genus of the class monadelphia, order polyandria. Calyx common, three-leaved, many-flowered, longer; arils five, one-seeded. Five species; herbs of the West Indies.

MALACHODENDRUM, in botany, a genus of the class monadelphia, order polyandria. Calyx simple; germ pear-shaped, pentagonal; styles five; capsules five; one-seeded. Two species: M. ovatum, and M. corchoroides, but neither of any note.

MALACHOLITE, in mineralogy, glassy actinolite; a species of actinotus. Found in the island of Sky in Scotland, near Allemont in Dauphigné, and in the Tyrolese mountains. See ACTINOTUS.

MALACHRA, in botany, a genus of the class monadelphia, order polyandria. Common calyx three-leaved, many-flowered; proper calyx campanulate, five-cleft; capsules five, one-seeded. Six species; natives of America.

MALACIA. (μαλαχια, from μαλαχιω, a ravenous fish.) In medicine, a term used by different writers in two senses, as importing ravenous longing generally, and a ravenous longing for unusual things. The last is the more common signification; and in this view it is synonymous with citta, pica, allotriophagia: and may be translated, depraved appetite, morbid desire of food. It is often found in chlorotic patients, not unfrequently in pregnant women, and occasionally in persons on recovery from severe illness.

It is in fact a species of cachexia, and the fancies are often very numerous and very extraordinary. They occasionally lead to a love of calcareous matter; but among the negroes any dirt is devoured, and such persons are called dirt-eaters. Sometimes the most disgusting substances are coveted. In general, however, the sound of brittle substances, as cinders or pipes between the teeth, seems to please as much as the taste; while even treading on cinders is apparently grateful. The immediate cause of this propensity is not known: the ultimate cause has been affirmed to be an absorption of acid, but this is erroneous, since the substances chiefly caused are not always nor indeed very generally antacid.

In pregnant women this disease is sometimes relieved by bleeding, and about the fourth month disappears.

MALACODERMATOUS (μαλακος, soft, and δερμα, skin.) Soft-skinned. A term formerly applied in natural history to such animals as have a soft skin for their integument, in opposition to those that possess a horny, crustaceous, or testaceous covering.

MALACOPTERYGEOUS. (μαλακος, soft, and πτερυγιον, a fin.) A term applied to fishes which, like the carp genus, have bony fins, but with soft and harmless, instead of sharp and pointed extremities.

MALACOSTOMOUS. (μαλακος, soft, and στομα, the mouth.) In ichthyology, a term applied to those tribes of fishes, which like the carp, bream, tench, &c. have soft leathern mouths, and their teeth placed behind the jaws.

MALACOSTRACA, in entomology, a term employed by Aristotle and the Greek philosophers, to characterise crustaceous insects or worms, as distinguished from testaceous or ostracodermatous as he denominates them. Latreille, in his recent arrangement of crustaceous animals, has revived the term, and made it import a sub-class: this crustaceous class consisting of two divisions, malacostraca and entomostraca. See the article CRUSTACEA.

MA'LADY. *s.* (*maladie*, French.) A disease; a distemper; a disorder of body (*Spen.*).

MALÆ OS. (from *malus*, so called from its roundness.) The cheek-bone. See JUGALE OS.

MALAGA, an ancient, rich, and strong town of Spain, in the kingdom of Granada, with two castles, a bishop's see, and a good harbour, which renders it a place of considerable commerce. The advantage of this commerce, according to M. Bourgoanne, is entirely in favour of Spain, but almost without any to its navigation: of 842 vessels which arrived at this port in 1782, from almost every commercial nation, scarcely 100 were Spanish, even reckoning the ships of war which anchored there. The English, who are in possession of the greatest part of the trade, carry thither woollens and great quantities of small ware; the Dutch carry spice, cutlery ware, laces, ribbons, thread, &c. These nations, those of the north, and Italy, export to the amount of two millions and a half of piastres in wines, fruits, sumach, pickled anchovies, oil, &c. and all they carry thither amounts only to about a million and a half. The balance would be still more advantageous for Malaga if the silk and wool of the kingdom of Granada were exported from this port; but these are employed in the country where they are produced. The streets of Malaga are narrow, but there are some good squares; and the cathedral church is a superb building, said to be as large as St. Paul's. The only other building of note is the bishop's palace; which is a large edifice, but looks insignificant from its being situated near the other. Its prelate enjoys a revenue of 16,000l. sterling. It is seated on the Mediterranean, surrounded by hills, 70 miles W.S.W. of Granada. Lon. 4. 10 W. Lat. 36. 35 N.

MALAGMA. (from μαλασσω, to soften.) In medicine, an emollient poultice or cataplasm.

MALAGRIDA (Gabriel), an Italian jesuit, sent into Portugal as a missionary. He became so ambitious, that he joined the duke d'Aveiro in his conspiracy against the king of Portugal. When the jesuits were banished, he resided still in the kingdom, and there became a violent enthusiast, declaring himself the ambassador and immediate prophet of God. His extravagant conduct and his writings were at last noticed by the inquisition, and when he declared that the king's death had been revealed to him, he was condemned by the arbitrary tribunal, and was burnt alive, 1761, aged 75, as a false prophet.

MALALEUCA, the cayputi tree: a genus of the polyandria order, belonging to the polyadelphia class of plants. There is but one species, viz. the leucodendrum, a native of the East Indies and South-Sea islands. Mr. Forster relates that leucodendra were found in the island of New Caledonia: they were black at the root: but had a bark perfectly white and loose, with long narrow leaves like our willows. The leaves are extremely fragrant and aromatic; and Rumphius tells us, that from them the natives of the Moluccas make the oil called cayputi. This oil is commended as a nervous medicine, and as being useful in some cardialgies. The dose is four or five drops in some convenient liquor

MALANDERS. (*malandria*, from *malandare*, to go ill, Ital.) A disease to which horses are subject, and which consists in ulcerous chaps or chinks appearing on the inside of the fore-legs, just above the bend of the knee, and discharge a red, sharp, pungent humour. The disease may be cured by washing the part affected with strong stimulating lotions, so as to induce a secondary action upon the morbid affection; such as strong soap lather, urine, solution of corrosive sublimate, the strong mercurial ointment, or a lotion of sulphate of vitriol dissolved in water. The application should be continued till the scabs have completely fallen off. After which a few gentle purges should be administered twice a week.

MA'LAPERT. *a.* (*mal* and *pert.*) Saucy; quick with impudence (*Dryden*).

MA'LAPERTNESS. *s.* (from *malapert.*) Liveliness of reply without decency; quick impudence; sauciness.

MA'LAPERTLY. *ad.* (from *malapert.*) Impudently; saucily.

MALARMAT, in ichthyology, a species of trigla, with numerous cirri, and an octagonal body. See TRIGLA.

MALATIA, a town of Asiatic Turkey, in Aladulia, and a bishop's see; seated on the W. side of the Euphrates, 90 miles W.N.W. of Diarbekar. Lon. 37. 50 E. Lat. 37. 30 N.

MALARUM OSSA, in anatomy, the cheek-bones. See JUGULARE OS, and ANATOMY.

MALATS, in chemistry, salts produced by a full dose of malic acid upon a salifiable base. (See MALIC ACID.) This acid is obtained with difficulty, and hence the salts to which it gives rise have not been very extensively examined. The following are the chief results which have hitherto been obtained:

Malat of potass.
Malat of soda.
Malat of ammonia.

The salts were produced by Scheele; they are deliquescent, and very soluble.

Malat of barytes.—When the acid is dropped into barytic water, a white powder precipitates, which is the malat of barytes. According to Scheele, the properties of this salt resemble those of malat of lime.

Malat of strontian.—Malic acid occasions no precipitate in strontian water. Hence it follows that malat of strontian is more soluble than malat of barytes.

Malat of lime.—When the acid is neutralised with lime, it forms a salt scarcely soluble in water, which may be obtained in crystals by allowing the super malat of lime to evaporate spontaneously. Crystals of neutral malat are formed in the solution. But this acid has a strong tendency to combine in excess with lime, and to form a super malat of lime. This

salt is produced when carbonat of lime is thrown into malic acid, or into any liquid containing it. This super salt exists in various vegetables, especially the semper-vivum tectorum, and some of the sedums.

Super-malat of lime has an acid taste. It yields a precipitate with alkalies, sulphuric acid and oxalic acid. Lime water saturates the excess of acid, and throws down a precipitate of malat of lime. When the super-malat of lime is evaporated to dryness, it assumes exactly the appearance of gum-arabic; and if it have been spread thin upon the finger-nail, or upon wood, it forms a varnish. It is not so soluble in water as gum arabic, and the taste readily distinguishes the two. Super-malat of lime is insoluble in alcohol.

Malat of magnesia.—This salt is very soluble in water, and when exposed to the air deliquesces.

Malat of alumina.—This salt is almost insoluble in water. Of course it precipitates when malic acid is dropt into a solution containing alumina. Mr. Chevenix has proposed this acid to separate alumina from magnesia: which earths, as is well known, have a strong affinity for each other.

To MALA'XATE. *v. a.* (μαλαττω.) To soften, or to knead to softness, any body.

MALAXATION. *s.* (from *malaxate.*) The act of softening.

MALAXIS, in botany, a genus of the class gynandria, order diandria. Nectary of one hollow, heart-shaped, erect leaf, embracing the organs of fructification: corol reversed. Three species: two common to Jamaica; one found in the marshes of our own country, with five-sided stem; leaves numerous, spatulate, rough at top; raceme many-flowered.

MALBROUK, in zoology, a species of simia or monkey, inhabiting Bengal, about a foot high, with a hoary pointed beard, grey face, large eyes, flesh-coloured eyelids; the forehead possessing a grey band instead of eyebrows; ears large, thin, flesh-coloured; body blackish; breast and belly white. See SIMIA.

MALDEN, a borough in Essex, with a market on Saturday; seated on an eminence, on the river Blackwater. It has two parish churches; and a third, which it had formerly, has been long converted into a free-school. Vessels of a moderate burden come up to the town, but large ships are obliged to unload at a distance below, in Blackwater bay. The custom of Borough-English is kept up here, by which the youngest son, and not the eldest, succeeds to the burgage tenure, on the death of his father. This town carries on a considerable trade, chiefly in corn, salt, coals, iron, deals, and wine. It is 10 miles E. of Chelmsford, and 37 N.E. of London.

MALDIVIA ISLANDS, a cluster of small islands in the Indian ocean, 500 miles south-west of the continent of the island of Ceylon. They are about 1000 in number, and are very small; extending from the second degree of south latitude to the seventh degree of north latitude. They are generally black low lands, surrounded by rocks and sands. The natives are of the same complexion with the Arabians, profess the Mahometan religion, and are subject to one sovereign. The channels between the islands are very narrow, and some of them are fordable. They produce neither rice, corn, nor herbage; but the natives live upon cocoanuts, and other fruits, roots, and fish. They have little or nothing to barter with, unless the shells called cowry, or blackmore's teeth, with which they abound: and these serve instead of small coin in many parts of India.

MALE, in natural history, that sex which is capable of generating, as the female is that which is capable of bearing and bringing forth. The generative organs in the male sex are for the most part placed exteriorly to the body, but not always: of which last kind the frog, and most fishes, furnish examples.

MALE. *a* (*male*, French.) Of the sex that begets young; not female (*Swift*).

MALE, in composition, signifies ill.

MALE FERN, in botany. See FELIX.

MALE ORCHIS, in botany. See SATYRION.

MALE SPEEDWELL, in botany. See VERONICA.

MALE SCREW. See SCREW.

MALEADMINISTRA'TION. *s.* Bad management of affairs (*Ayliffe*).

MALEBRANCHE (Nicholas), an eminent French metaphysician, the son of Nicholas Malebranche, secretary to the French king, was born in 1638, and admitted into the congregation of the oratory in 1660. He at first applied himself to the study of languages and history: but afterwards meeting with Des Cartes's Treatise of Man, he gave himself up entirely to the study of philosophy. In 1699, he was admitted an honorary member of the Royal Academy of Sciences at Paris. Notwithstanding he was of a delicate constitution, he enjoyed a pretty good state of health till his death, which happened in 1715, at the age of 77. Father Malebranche read little, but thought a great deal. He despised that kind of philosophy which consists only in knowing the opinions of other men, since a person may know the history of other men's thoughts without thinking himself. He could never read ten verses together without disgust. He meditated with his windows shut, in order to keep out the light, which he found to be a disturbance to him. His conversation turned upon the same subjects as his books; but was mixed with so much modesty and deference to the judgment of others, that it was extremely and universally desired. His books are famous; particularly his Recherche de la Verité, i. e. Search after truth: his design in which is, to point to us the errors into which we are daily led by our senses, imagination, and passions; and to prescribe a method for discovering the truth, which he does, by starting the notion of seeing all things in God. And

hence he is led to think and speak merely of human knowledge, either as it lies in written books, or in the book of nature, compared with that light which displays itself from the ideal world; and, by attending to which, with pure and defecate minds, he supposes knowledge to be most easily had. The fineness of this author's sentiments, together with his fine manner of expressing them, made every body admire his genius and abilities; but he has generally passed for a visionary philosopher. Mr. Locke, in his examination of Malebranche's opinion of seeing all things in God, styles him "an acute and ingenious author;" and tells us, that there are "a great many very fine thoughts, judicious reasonings, and uncommon reflections in his Recherche." But Mr Locke, in that piece, [illegible] to refute the chief principles of his system. He wrote many other pieces besides that we have mentioned, all tending some way or other to confirm his main system, established in the Recherche, and to clear it from the objections which were brought against it, or from the consequences which were deduced from it; and if he has not attained what he aimed at in these several productions, he has certainly shown great abilities and a vast force of genius.

MALECONTENT. MALECONTE'NTED. *a.* (*male* and *content.*) Discontented; dissatisfied (*Shakspeare*).

MALECONTE'NTEDLY. *ad.* (from *malecontent.*) With discontent.

MALECONTE'NTEDNESS. *s.* (from *malecontent.*) Discontentedness; want of affection to government (*Spectator*).

MALEDI'CTED. *a.* (*maledictus*, Latin.) Accursed.

MALEDI'CTION. *s.* (*malediction*, Fr.) Curse; execration; denunciation of evil (*Wotton*).

MALEFA'CTION. *s.* (*male* and *facio*, Lat.) A crime; an offence (*Shakspeare*).

MALEFA'CTOR. *s.* (*male* and *facio*, Latin.) An offender against law; a criminal (*Roscommon*).

MALE'FICK. MALE'FIQUE. *a.* (*maleficus*, Latin.) Mischievous; hurtful.

MALEPRA'CTICE. *s.* (*male* and *practice.*) Practice contrary to rules.

MALESHERBES (Christian William Lamoignon), a celebrated Frenchman, born at Paris, 1721, and brought up to the bar. He for 25 years was zealously engaged in the service of his country, in supporting and invigorating the industry of her inhabitants, as president of the court of aides; and after he had retired to his estate, he was recalled in 1775, by Louis XVI. to become the minister of the interior. The prisons were now visited, and no longer contained any but criminals who had violated the law; various employments recommended habits of industry, and the apartments were rendered more commodious for the unfortunate captives. The retirement of Turgot was attended by that of his friend Malesherbes, who now travelled under an assumed name, and in a plain dress, over France, Switzerland, and Holland, and in examining the various manufactures, curiosities, and arts of each province. He hailed the revolution as the forerunner of blessings, but soon saw his hopes vanish; yet while others fled he boldly appeared before the convention; and actuated by gratitude, he no sooner saw his sovereign dragged as a criminal before his subjects, than he demanded the privilege and the honour of being his defender. The heroic conduct of this venerable man had no effect on the bloody convention. His appeals in favour of Louis were of no avail, and he was the first to announce to the unfortunate monarch the ill success of his defence. So much goodness ought to have met respect among a civilized nation, but otherwise. No sooner was his daughter accused of treason and hurried to prison, than the aged father requested to accompany his beloved child. The request was granted, and in a few days, alas! he appeared with her and her child before the revolutionary tribunal, and with her and her child he ascended the scaffold, 1793. He was author of a treatise on rural economy—thoughts and maxims—two memoirs on the civil state of the protestants.

MALE'VOLENCE. *s.* (*malevolentia*, Lat.) Ill-will; inclination to hurt others; malignity (*Shakspeare*).

MALE'VOLENT. *a.* (*malevolus*, Latin.) Ill-disposed towards others; malignant (*Dry.*).

MALE'VOLENTLY. *ad.* Malignly; malignantly; with ill-will (*Howel*).

MALHERBE (Francis de), a French poet, who, according to Bayle and Boileau, formed the taste of his countrymen in matters of polite literature, and introduced, with purity of language, harmonious numbers, and a just cadence. He was born at Caen about 1555, and died at Paris, 1628. He was patronised by Henry the Great and Mary de Medicis. Though an elegant writer, he composed verses with great labour. His works, divided into six books, consist of paraphrases on the psalms, odes, sonnets, and epigrams.

MALIC ACID. (from *malum*, an apple.) An acid obtained by saturating the juice of apples with alkali, and pouring in the acetous solution of lead until it occasions no more precipitate. The precipitate is then to be edulcorated, and sulphuric acid poured upon it until the liquor has acquired a fresh acid taste, without any mixture of sweetness. The whole is next to be filtered, in order to separate the sulphate of lead. The filtered liquor is the malic acid, which is very pure, remains always in a fluid state, and cannot be rendered concrete.

This acid exists also in common house-leek, and some sedums combined with lime, and may be obtained from them by the above means.

It may likewise be formed by the action of nitric acid on sugar. If nitric acid be distilled with an equal quantity of sugar, till the mixture assumes a brown colour (which is a sign that all the nitric acid has been abstracted

from it), this substance will be found of an acid taste; and after all the oxalic acid, which may have been formed, is separated by lime-water, there remains another acid, which may be obtained by the following process: saturate it with lime and filter the solution; then pour upon it a quantity of alkohol, when a coagulation will take place. This coagulum is the acid combined with lime. Separate it by filtration, and edulcorate it with fresh alkohol: then dissolve it in distilled water, and pour in acetat of lead till no more precipitation ensues. The precipitate is the acid combined with lead, from which it may be separated by diluted sulphuric acid.

Malic acid, thus obtained, is a liquid of a reddish brown colour and a very acid taste. When evaporated it becomes thick and viscid like a mucilage or syrup, but it does not crystallize. When exposed to a dry atmosphere, in thin layers, it dries altogether, and assumes the appearance of varnish. When heated in the open fire it becomes black, swells up, exhales an acrid fume, and leaves behind it a very voluminous coal. When distilled the products are an acid water, a little carburated hydrogen gass, and a large proportion of carbonic acid. It is very soluble in water. It gradually decomposes spontaneous by undergoing a kind of fermentation in the vessels in which it is kept. Sulphuric acid chars it, and nitric acid converts it into oxalic acid. Hence it is evident that it is composed of oxygen, hydrogen, and carbon, though the proportions of these substances have not been ascertained.

Malic acid combines with alkalies, earths, and metallic oxyds, and forms salts known by the name of MALATS, which see.

Its affinities have not yet been ascertained.

This acid bears a strong resemblance to the citric; but differs from it in the following particulars:

1. The citric acid shoots into fine crystals, but the malic does not crystallize. 2. The salt formed from the citric acid with lime is almost insoluble in boiling water; but the salt made with lime and the malic acid is readily soluble in boiling water. 3. Malic acid precipitates mercury, lead, and silver, from the nitrous acid; and also the solution of gold when diluted with water: but citric acid produces no effect upon any of these solutions. 4. Malic acid seems to have a less affinity for lime than citric acid has; for when a solution of lime in the former is boiled a minute, with a salt formed from volatile alkali and citric acid, a decomposition takes place, and the latter acid combines with the lime and is precipitated.

MA'LICE. *s.* (*malice*, French.) 1. Badness of design; deliberate mischief (*Taylor*). 2. Ill-intention to any one; desire of hurting (*Shakspeare.*)

To MA'LICE. *v. a.* (from the noun.) To regard with ill-will: obsolete (*Spenser*).

MALICE, in ethics and law, is a formed design of doing mischief to another; it differs from hatred. In murder, it is malice makes the crime; and if a man, having a malicious intent to kill another, in the execution of his malice kills a person not intended, the malice shall be connected to his person, and he shall be adjudged a murderer. The words *ex malitia præcogitata* are necessary to an indictment of murder, &c. And this *malitia præcogitata*, or *malice prepense*, may be either express or implied in law. Express malice is, when one, with a sedate, deliberate mind, and formed design, kills another; which formed design is evidenced by external circumstances, discovering that intention; as lying in wait, antecedent menaces, former grudges, and concerted schemes to do him some bodily harm. Besides, where no malice is expressed, the law will imply it; as where a man wilfully poisons another, in such a deliberate act the law presumes malice, though no particular enmity can be proved. And if a man kills another suddenly, without any, or without a considerable provocation, the law implies malice; for no person, unless of an abandoned heart, would be guilty of such an act upon a slight or no apparent cause.

MALI'CIOUS. *a.* (*malicieux*, French.) Ill-disposed to any one; intending ill; malignant (*Shakspeare*).

MALI'CIOUSLY. *ad.* With malignity; with intention of mischief (*Swift*).

MALI'CIOUSNESS. *s.* Malice; intention of mischief to another (*Herbert*).

MALI'GN. *a.* (*maligne*, French.) 1. Unfavourable; ill-disposed to any one; malicious (*South*). 2. Infectious; fatal to the body; pestilential (*Bacon*).

To MALI'GN. *v. a.* (from the adjective.) 1. To regard with envy or malice (*South*). 2. To mischief; to hurt; to harm.

MALI'GNANCY. *s.* (from *malignant.*) 1. Malevolence; malice; unfavourableness (*Shak.*). 2. Destructive tendency (*Wiseman*).

MALI'GNANT. *a.* (*malignant*, French.) 1. Malign; envious; unpropitious; malicious; mischievous (*Watts*). 2. Hostile to life: as, *malignant* fevers (*Dryden*).

MALI'GNANT. *s.* 1. A man of ill intention malevolently disposed (*Hooker*). 2. It was a word used for the defenders of the church and monarchy by the rebel sectaries in the civil wars.

MALIGNANT, in medicine, a term applied to fevers accompanied with a considerable degree of danger: usually from approaching or threatening putridity; in which last case the signs are a slight coldness and shivering, quickly followed by a great loss of strength, a small, rapid, and contracted pulse, faintness, if in an erect posture, drowsiness without sleep, or the sleep not refreshing, but followed by a greater prostration of strength, and delirium. There is little pain, thirst, or other troublesome symptom, and yet the patient is uneasy; the features are contracted and sunk; the extremities become cold, the pulse intermits, and death soon terminates the scene.

MALI'GNANTLY. *ad.* (from *malignant.*) With ill intention; maliciously; mischievously.

MALI'GNER. *s.* (from *malign.*) 1. One who regards another with ill-will (*Swift*). 2. Sarcastical censurer (*Glanville*).

MALI'GNITY. *s.* (*malignité*, French.) 1. Malice; maliciousness (*Tickel*). 2. Contrariety to life; destructive tendency. 3. Evilness of nature (*South*).

MALI'GNLY. *ad.* (from *malign.*) Enviously; with ill-will; mischievously (*Pope*).

MALIS, in medicine, cocyta; a pungent pain from an animalcule lodged in an ulcerous tumour; or pain from an insect lodged in any part without ulcer or tumour. The insects which produce this pain are various. In Persia it proceeds from the gordius, vena medinensis or dracunculus: in America from the pulex: and in Europe it is sometimes produced by the pediculus.

MA'LKIN. *s.* (*mal*, of *Mary*, and *kin.*) A kind of mop made of clouts for sweeping ovens; thence a frightful figure of clouts dressed up; thence a dirty wench (*Shakspeare*).

MALL. *s.* (*malleus*, Lat. a hammer.) 1. A kind of beater or hammer (*Addison*). 2. A stroke; a blow: not in use (*Hudibras*). 3. A walk where they formerly played with malls and balls (*Pope*).

To MALL. *v. a.* (from the noun.) To beat or strike with a mall.

MALL, in ornithology. See LARUS.

MALLAM-TODDALI, in botany, the celtis orientalis of the species plantarum, No. 1478: a Malabar tree, whose root, bark, leaves, and fruit, were formerly esteemed specifics in the epilepsy. See CELTIS.

MALLARD, in ornithology. See ANAS.

MALLEABILITY, in metallurgy, the property which various metals possess of being extended under the hammer into thin plates without cracking, and which gives rise to a peculiar division of metals in many systems of chemistry and mineralogy. The principal metals whose malleability has been hitherto determined are the following:

Gold.	Osmium.
Platina.	Copper.
Silver.	Iron.
Mercury.	Nickel.
Palladium.	Tin.
Rhodium.	Lead.
Iridium.	Zinc.

MA'LLEABLE. *a.* (*malleable*, Fr. from *malleus*, Latin, a hammer.) Capable of being spread by beating (*Newton*).

MA'LLEABLENESS. *s.* (from *malleable.*) Quality of enduring the hammer; malleability; ductility (*Locke*).

MALLEAMOTHE, in botany, pavetta Indica, pavette, Spec. Plant. 160: a Malabar shrub. The leaves boiled in palm-oil are employed as a cure in impetigo: the root powdered and mixed with ginger is said to be diuretic.

To MA'LLEATE. *v. a.* (from *malleus*, Lat.) To hammer (*Derham*).

MALLEI ANTERIOR, in anatomy. See LAXATOR TYMPANI.

MALLEI EXTERNUS, in anatomy. See TENSOR TYMPANI.

MALLENDERS. See MALENDERS.

MALLEOLI, in the ancient art of war, were bundles of combustible materials, set on fire to give light in the night, or to annoy the enemy; when they were employed for the latter purpose they were shot out of a bow, or fixed to a javelin, and thus thrown into the enemies engines, ships, &c. in order to burn them. Pitch was always a principal ingredient in the composition. The malleoli had also the name of pyroboli.

MALLEOLUS. (diminution of *malleus*, a mallet, so called from its supposed resemblance.) In anatomy, the ankle, distinguished into external and internal, or malleolus externus and internus.

In botany, the same term is applied to the cuttings of vines with joints of the old wood at their bottom, resembling a little mallet.

MALLET, a large kind of hammer made of wood; much used by artificers who work with a chisel, as sculptors, masons, and stonecutters, whose mallet is ordinarily round; and by carpenters, joiners, &c. who use it square. There are several sorts of mallets used for different purposes on ship-board. The calking mallet is chiefly employed to drive the oakum into the seams of a ship, where the edges of the planks are joined to each other in the sides, deck, or bottom. The head of this mallet is long and cylindrical, being hooped with iron to prevent it from splitting in the exercise of calking. There is also the serving mallet, used in serving the rigging, by binding the spun-yarn more firmly about it than it could possibly be done by hand, which is performed in the following manner: the spun-yarn being previously rolled up in a large ball or clue, two or three turns of it are passed about the rope, and about the body of the mallet, which for this purpose is furnished with a round channel in its surface, that conforms to the convexity of the rope intended to be served. The turns of the spun-yarn being strained round the mallet, so as to confine it firmly to the rope, which is extended above the deck, one man passes the ball continually about the rope, whilst the other, at the same time, winds on the spun-yarn by means of the mallet, whose handle acting as a lever strains every turn about the rope as firm as possible.

MALLET, or MALLOCH (David), an English poet, but a Scotsman by birth, was born in that country about 1700. By the penury of his parents, he was compelled to be janitor of the high school at Edinburgh; but he surmounted the disadvantages of his birth and fortune; for when the duke of Montrose applied to the college of Edinburgh for a tutor to educate his sons, Malloch was recommended. When his pupils went abroad, they were intrusted to his care; and having conducted them through their travels, he returned with them to London. Here, residing in their family, he naturally gained admission to persons

of high rank and character, and began to give specimens of his poetical talents. In 1733, he published a poem on verbal Criticism, on purpose to make his court to Pope. In 1740, he wrote a Life of Lord Bacon, which was then prefixed to an edition of his works; but with so much more knowledge of history than of science, that, when he afterwards undertook the Life of Marlborough, some were apprehensive lest he should forget that Marlborough was a general, as he had forgotten that Bacon was a philosopher. The old duchess of Marlborough assigned in her will this task to Glover and Mallet, with a reward of 1000l. and a prohibition to insert any verses. Glover is supposed to have rejected the legacy with disdain, so that the work devolved upon Mallet; who had also a pension from the late duke of Marlborough to promote his industry, and who was continually talking of the discoveries he made, but left not when he died any historical labours behind. When the prince of Wales was driven from the palace, and kept a separate court by way of opposition, to increase his popularity by patronizing literature, he made Mallet his under secretary, with a salary of 200l. a year. Thomson likewise had a pension; and they were associated in the composition of the Masque of Alfred, which in its original state was played at Cliefden in 1740. It was afterwards almost wholly changed by Mallet, and brought upon the stage of Drury-lane in 1751, but with no great success. He had before published two tragedies; Eurydice, acted at Drury-lane in 1731; and Mustapha, acted at the same theatre in 1739. It was dedicated to the prince his master, and was well received, but never was revived. His next work was Amyntor, and Theodora (1747), a long story in blank verse; in which there is copiousness and elegance of language, vigour of sentiment, and imagery well adapted to take possession of the fancy. In 1753, his masque of Britannia was acted at Drury-lane, and his tragedy of Elvira in 1763; in which year he was appointed keeper of the book of entries for ships in the port of London. In the beginning of the last war, when the nation was exasperated by ill success, he was employed to turn the public vengeance upon Byng, and wrote a letter of accusation under the character of a Plain Man. The paper was with great industry circulated and dispersed; and he for his seasonable intervention had a considerable pension bestowed upon him, which he retained to his death. Towards the end of his life he went with his wife to France; but after a while, finding his health declining, he returned alone to England, and died in April 1765. He was twice married, and by his first wife had several children. One daughter, who married an Italian of rank named Cilesia, wrote a tragedy called Almida, which was acted at Drury-lane. His second wife was the daughter of a nobleman's steward, who had a considerable fortune, which she took care to retain in her own hands.

Mallet (Edme) was born at Melun in 1713, and enjoyed a curacy in the neighbourhood of his native place till 1751, when he went to Paris to be professor of theology in the college of Navarre, of which he was admitted a doctor. Boyer, the late bishop of Mirepoix, was at first much prejudiced against him; but being afterwards undeceived, he conferred upon him the see of Verdun as a reward for his doctrine and morals. Jansenism had been imputed to him by his enemies with this prelate; and the gazette which went by the name of Ecclesiastical, accused him of impiety. Either of these imputations was equally undeserved by the Abbé Mallet: as a Christian, he was grieved at the disputes of the French church; and as a philosopher, he was astonished that the government had not from the very beginning of those dissentions imposed silence on both parties. He died at Paris in 1755, at the age of 42. The principal of his works are, 1. Principes pour la lecture des Poetes, 1745, 12mo 2 vols. 2. Essai sur l'Etude des Belles-Lettres, 1747, 12mo. 3. Essai sur les bienseances oratoires, 1753, 12mo. 4. Principes pour la lecture des Orateurs, 1753, 12mo. 3 vols. 5. Histoire des Guerres civiles de France sous les regnes de Francois II. Charles IX. Henri III. & Henri IV translated from the Italian of d'Avila. In Mallet's works on the Poets, Orators, and the Belles-Lettres, his object is no more than to explain with accuracy and precision the rules of the great masters, and to support them by examples from authors ancient and modern. The style of his different writings, to which his mind bore a great resemblance, was neat, easy, and unaffected. But what must render his memory estimable, was his attachment to his friends, his candour, moderation, gentleness, and modesty. He was employed to write the theological and belles-lettres articles in the Encyclopédie; and whatever he wrote in that dictionary was in general well composed. Abbé Mallet was preparing two important works when the world was deprived of him by death. The first was Une Histoire generale de nos Guerres depuis le commencement de la Monarchie; the second, Une Histoire du Concile de Trente, which he intended to set in opposition to that of Father Paul translated by Father le Courayer.

MALLEUS. (*malleus*, a hammer, so called from its supposed resemblance.) In anatomy, a bone of the internal ear. It is distinguished into a head, neck, and manubrium. The head is round, and encrusted with a thin cartilage, and annexed to another bone of the ear, the incus, by the junction called ginglymus. (See Anatomy.) Its neck is narrow, and situated between the head and manubrium or handle; a long process issues from it, adheres to a furrow in the auditory canal, and is continued as far as the fissure in the articular cavity of the temporal bone. The manubrium or handle is terminated by an enlarged extremity, and connected to the membrana tympani by a short conoid process.

MALLICOLLO, one of the largest of the New Hebrides, in the Pacific Ocean. It extends 20 leagues from N. to S. Its inland mountains are very high, and clad with forests. Its vegetable productions are luxuriant, and in great variety; cocoa-nuts, bread-fruit, bananas, sugar-canes, yams, eddoes, turmeric, and oranges. Hogs and common poultry are the domestic animals. The inhabitants appear to be of a race totally distinct from those of the Friendly and Society Islands. Their form, language, and manners, are widely different. They seem to correspond in many particulars with the natives of New Guinea, particularly in their black colour and woolly hair. They go almost naked, are of a slender make, have lively, but very irregular ugly features, and tie a rope fast round their belly. They use bows and arrows as their principal weapons, and the arrows are said to be sometimes poisoned. They keep their bodies entirely free from punctures, which is one particular that remarkably distinguishes them from the other tribes of the Pacific Ocean. Lon. 167. 45 E. Lat. 16. 15 S.

MALLING (West), a town in Kent, with a market on Saturday, six miles W. of Maidstone, and thirty E. by S. of London. Lon. 0. 33 E. Lat. 51. 20 N.

MALLINGTONIA, in botany, a genus of the class didynamia, order angiospermia. Calyx with a five-toothed reflected margin; corol with a very long tube, and four-cleft border; anthers two-parted, sheathing; silique doubtful. One species; a very large tree, with terminal panicle, and white odorous corol; propagated in our gardens, but its native climate unknown.

MALLOW, in botany. See MALVA.

MALLOW (Bastard). See MALOPE.

MALLOW (Jew's). See CORCORUS.

MALLOW (Indian). See SIDA.

MALLOW (Marsh). See ALTHÆA.

MALLOW (Musk). See HIBISCUS.

MALLOW (Rose). See ALCEA.

MALLOW (Syrian). See HIBISCUS.

MALLOW TREE. See LAVATERA.

MALLOW (Venice). See HIBISCUS.

MALLOW, a town of Ireland, in the county of Cork, seated on the Blackwater, 17 miles N. of Cork. Lon. 8. 32 W. Lat. 52. 10 N.

MALMEDY, a town of the Netherlands, in the bishopric of Liege, with an abbey. It was taken by the French in 1794. It is seated on the Recht, nine miles S. of Limburg. Lon. 6. 2 E. Lat. 50. 18 N.

MALMISTRA, an ancient town of Natolia, with an archbishop's see; seated at the mouth of a river of the same name, which divides it into the Old and New Town. It is 30 miles S.E. of Terasso. Lon. 36. 15 E. Lat. 36. 50 N.

MALMOE, a seaport of Sweden, in the province of Schonen, with a large harbour and a strong citadel. It is seated on the Sound, 15 miles S.E. of Copenhagen. Lon. 13. 7 E. Lat. 53. 38 N.

MALMSAS, a town of Sweden, in the province of Sudermania, 23 miles W.N.W. of Nikoping.

MALMSBURY, an ancient borough in Wiltshire, with a market on Saturday. In the church, which was formerly an abbey church, is the monument of king Arthur, who was buried under the high altar. Malmsbury has a considerable trade in the woollen manufacture, and sends two members to parliament. It is seated on a hill, almost surrounded by the Avon, over which it has six bridges, 26 miles E. by N. of Bristol, and 95 W. of London Lon. 2. 0 W. Lat. 53. 34 N.

MALMSEY, or MALVASY, a rich luscious kind of wine brought from Greece to Candia; so called from Malvasia, a city in Peloponnesus, the ancient Epidaurus, whence this celebrated liquor was first brought.

That brought from Candia is now esteemed the best.

MALMSEY, or MALVISY, is also the name of a kind of muscadine wine brought from Provence.

MALO (St.), a seaport of France, in the department of Morbian, and lately an episcopal see. It has a large harbour, difficult of access, on account of the rocks that surround it; and is a trading place of great importance, defended by a strong castle. It was bombarded by the English in 1693, but without success. In 1758, they landed in Cancalle Bay, went to the harbour by land, and burnt above 100 ships. St. Malo is seated on an island, united to the mainland by a causeway, 17 miles N.W. of Dol, and 205 W. of Paris. Lon. 1. 57 W. Lat. 48. 39 N.

MALORIA, a small island of Italy, on the coast of Tuscany, 10 miles W. of Leghorn. Lon. 10. 4 E. Lat. 43. 34 N.

MALPARTIDO, a town of Spain, in Estremadura, 14 miles S. of Placentia. Lon. 5. 30 W. Lat. 39. 36 N.

MALPAS, a town in Cheshire, with a market on Monday, seated on a high eminence, near the river Dee, 15 miles S.E. of Chester, and 166 N.W. of London. Lon. 2. 45 W. Lat. 53. 2 N.

MALPIGHI (Marcello), an eminent Italian physician and anatomist in the 17th century. He studied under Massari and Mariano. The duke of Tuscany invited him to Pisa, to be professor of physic there. In this city he contracted an intimate acquaintance with Borelli, to whom he ascribed all the discoveries he had made. He went back to Bologna, the air of Pisa not agreeing with him. Cardinal Antonio Pignatelli, who had known him while he was legate at Bologna, being chosen pope in 1691, under the name of Innocent XII. immediately sent for him to Rome, and appointed him his physician. But this did not hinder him from pursuing his studies, and perfecting his works, which have immortalized his memory. He died in 1694; and his works with his life written by himself prefixed, were first collected and printed at London, in folio, 1667.

MALPIGHIA, in botany, so named in ho-

nour of the preceding Marcello Malpighi, professor of medicine at Bologna, a genus of the decandria trigynia class and order. Natural order of trihilatæ. Malpighiæ, Jussieu. Essential character: calyx five-leaved, with melliferous pores on the outside at the base; petals five, roundish, with claws; berry one-celled, three-seeded. There are eighteen species, of which M. glabra, smooth-leaved Barbadoes cherry, usually grows to the height of sixteen or eighteen feet; leaves opposite, subsessile, acute, continuing all the year; flowers in axillary and terminating bunches; the pedicles have a single joint; calyx incurved with glands; petals subcordate; stigmas simple, with a little drop; fruit red, round, the size of a cherry. This tree grows plentifully in most of the islands in the West Indies; whether it is natural there or not is difficult to determine, for birds being fond of the fruit, they disperse the seeds every where in great abundance.

MALPLAQUET, a village of Austrian Hainault, seven miles S. by E. of Mons. It is famous for a victory gained over the French, by the duke of Marlborough, in 1709, and sometimes called the Battle of Blaregnies, from an adjacent village.

MALSESENA, a town of Italy, in the Veronese, 18 miles N.N.W. of Verona.

MALT, a term applied to grain which has been made to germinate artificially to a certain extent, after which the process is stopped by the application of heat; thus fitting it for making a potable liquor under the denomination of beer or ale. See BREWING.

A report has been lately published by Mr. John Carr, on the sprinkling of malt on the floor, which is recommended by the commissioners of excise to the lords of the treasury. An abridgment of this report has been published in the Retrospect of Philosophical Discoveries, of which we shall avail ourselves in the present article.

As a correct knowledge of that part of the process of malting wherein nature is principally employed is the foundation of all reasoning upon the subject, Mr. Carr gives the following as probably the true theory of malting.

The barley grain consists of the germ comprising both the plumula (acrospire) and the radicle; and of a portion of farinaceous matter, intended to be converted into saccharine matter by germination. When the grain is made moist and warm, it imbibes the heat and moisture, and swells greatly. The radicle it most susceptible of this enlargement, and also attracts the oxygen of the atmosphere, which, after depositing heat on entering into combination with the farinaceous substance of the grain, converts this substance into saccharine matter. The radicle soon pierces the husk of the grain, and throws out fibres that elongate downwards. At the same time the acrospire, invigorated by the heat produced from the combination of the oxygen, slowly advances through the body of the grain, and piercing the opposite end, shoots up into a green blade, leaving the empty husk behind it.

The most important part in the manipulation of malting consists in the nice adjustment and due regulation of the heat generated in the process. And as the formation of saccharine matter is progressive, and the grain is ulteriorly totally deprived of it, it is necessary to seize the proper time to stop the germination of the corn, by throwing it upon the kiln, in order to procure the greatest proportion of saccharine matter.

Mr. Reynoldson asserts, that the saccharine matter exists ready formed in the barley, and that malting only developes it; but this is so contrary to the fact as not to require any refutation.

Malting, therefore, is only the promotion of a healthy germination of barley up to that period when the largest proportion of saccharine matter has been formed. As in every natural process a variation of the means will necessarily cause a difference in the product, the great difference in the process, when watering is used, or not, must render the quality of the malt in one case superior to the other.

If grain throws out too much root, the substance will be exhausted, and the malt light and unproductive. Hence the process which fully malts the barley with the least possible root is the best, and it is well known that the Hertfordshire method of not watering the corn on the floor produces only a short and small radicle. The other method of watering the corn throws out a much larger root, which being afterwards burnt off on the kiln, becomes mere waste, and is the cause why malt, forced as it were by watering, is lighter and less productive than when made by the Hertfordshire method.

Maltsters commonly suppose that the grain becomes malted just so far as the acrospire penetrates the grain, and that the unpenetrated part remains barley; but the evidence of Messrs. King and Clough sufficiently established that the best malt is made when the acrospire proceeds only two thirds through the grain. In fact, the radicle is the efficient organ in malting the barley, while the acrospire simply feeds on it, so that in the Hertfordshire method, where the corn is constantly kept cool, the growth of the acrospire is sufficiently slow and gradual to allow the radicle to malt the whole substance of the grain, though the acrospire has not proceeded all through the barley: whereas, in forcing the grain by watering it, the acrospire is driven rapidly forward, and being insoluble in the process of brewing, it contributes to waste the malt.

Malt made by watering weighs from 15 to 20 pounds in four bushels less than an equal measure of malt that has not been watered. And watered malt affords only 64 pounds of extract, while unwatered malt yielded 84 pounds from the same quantity.

An excess and fluctuation of heat are certainly highly injurious to the regular progress of vegetation. When there is no increase of moisture after the corn leaves the cistern, an equable temperature can be preserved with much certainty; but when the floors are

watered, this equable temperature cannot be kept up, an unequal vegetation takes place, the moisture is evaporated, and the heat again renders water indispensable.

This heat improperly rising to excess in the young floors, is the true cause of what is termed flinty malt. The flint consists of little hard knobs in the grain, which are insoluble. The heat occasions the glutinous mucilage of the barley to run into a clammy substance, somewhat like birdlime, which hardens on the kiln.

As the agents of the watering party deny their process to be the cause of flint, so do they assert that they can make malt of superior flavour by sprinkling the grain; but certainly that malt which is worked in the most pure, clean, and natural manner, will be the most free from any adventitious flavour. In watering on the floors the grain is turned immediately after it has been sprinkled; hence the wet corn is placed at the bottom, and some of this will again be thrown undermost in the subsequent turnings, and become mouldy. The disgusting taste of these grains infects all those in contact with them, and materially affects the flavour of the beer.

To mix the coarsest and heaviest barleys with the very finest in the same cistern, would certainly be improper. It appears, indeed, that thick-skinned corn requires to remain a few hours longer in the cistern; but Messrs. Clough and King have fully established, that better malt can be made from coarse barley without watering it, than by sprinkling it. The agents of the watering party are equally mistaken in asserting, that although the plump barleys of the south may be malted without being watered, the inferior corn from the north requires sprinkling. But it is well known that the inferior barleys are apt to run themselves out by too quick a vegetation, and yet they cannot, from their lightness, allow any part of their substance to be lost in the process of malting.

There are only three varieties of malt, viz. brown, amber, and pale malt. The two first are peculiar to porter brewing, to communicate flavour and colour. The third is the basis of porter, and all other malt liquor. Brown malt is made on the kiln, by what is called blowing. It is spread very thin, and a quick heat is passed through it from blazing faggots, which blows up the husk, and renders the grains large and hollow, with an increase of measure, of one or two bushels in a quarter. The use of this malt is rapidly declining. Amber malt is a variety between brown and pale malt, and is made by giving it less fire than the former, and more than the latter. It is still generally used in porter along with pale malt, but the quantity made is inconsiderable.

If the vegetation of the grain has been imperfect, the product will be partly malt and partly barley, and of course heavier than good malt. If the vegetation has been carried too far, much of the substance of the malt will be driven out, and the malt will be proportionably light. This is so well known in the markets, that the buyers of malt usually govern themselves, as to the price, by the weight which a certain measure of the sample yields In this respect, Hertfordshire malt preserves a distinguished superiority over watered malt.

There are no frauds of any extent practicable at a malthouse, except those which are immediately connected with the practice of watering the corn on the floors. A cautious and artful maltster may defraud the revenue of half the duty which he ought to pay, and yet incur very little risk of detection, provided he is indulged with watering the short wet corn on the floors.

The revenue upon malt can only be protected from very extensive depredation, and the quality of the commodity preserved from a most improvident waste, by the restriction against watering on the floors being extended from its present period of nine to twelve days, for a very material circumstance was overlooked when the present restriction was established, viz. that when short wet corn is fraudulently laid upon the floors, it does not take the true age of its being removed from the cistern, but a false age of the date of the preceding steeping, either from its being mixed with the youngest floor, or passing for it in the officer's account. In this way three days of false age can be readily gained, and the corn watered on the seventh instead of the tenth day. But on the old restriction of twelve days, the short wet corn could not be worked up to that period without watering it, by which the penalty was risked, and the officer's attention excited.

This statement of the theory of malting was confirmed by visiting all the principal malthouses in England, and conversing with the oldest labourers as well as with their masters.

In Hertfordshire, and in the northern direction from London, where malt is made without watering, 115 malthouses were visited. The corn was usually kept under water, from 48 to 56 hours, according to the weather. When thrown out of the cistern, it remains in the couch from 26 to 30 hours, and it is kept for a day longer at a depth of 10 to 16 inches. The increase of temperature is carefully watched, and checked by turning the grain. By the fourth day, the root has come freely out, and the corn is spread very thin, so that the temperature is but a little above that of the air. It is worked in this manner up to the eighth or ninth day. The root in the mean while turns back, and forms a little bushy knot of fibres, which rarely exceeds half an inch in length. To promote the growth of the acrospire, the grain is then laid a little deeper, and so gradually increased up to the kiln, when the acrospire has reached two-thirds, or at most three-fourths of the grain. The old floors were fresh, sound, and in healthy vegetation; even where the grain had been some time on the kiln, the moisture flying off in a dense vapour shewed that the barley had carried with it from the cistern a sufficiency of water for the purpose of completely malting it. The malthouses were kept remarkably open, and yet the cistern water was not expended by evaporation. The coolness of the floors was avowedly to prevent the corn from sweating out the cistern water, and to keep back the vegetation.

The brewers, some of whom were also maltsters, asserted that they could draw upwards of half a barrel more wort, of equal goodness, from a quarter of unwatered malt than from watered. The usual quantity was three barrels and a half to a quarter of malt. Scarce any of the porter malts were in preparation.

About 60 malthouses were visited in Surrey and the country west of London, where the corn is usually watered on the floors. For the first three days after the barley is thrown out of the cistern, it is kept 16 or 18 inches deep, and sweats very much, throwing out a long root. It is then spread out very thin, to carry off the remainder of the cistern water by evaporation, which checks the vegetation, so that on the ninth day the root is frequently flaccid and brown. As soon as the nine days of restriction are expired, the corn is watered, at three separate sprinklings, turning over the corn each time, and leaving it undisturbed from 12 to 18 hours. In some cases the operation is repeated. A second root is thus thrown out, by the side of the old one, which last is purposely beat off in turning. This new root increases the measure of the malt, and with the same view the acrospire is frequently driven much beyond the end of the grain; but the length of the acrospire was very various. In many floors the corn was run together in hard bunchy knots, by the fibres of the roots matting together. Many also of the floors were mouldy, or, as they term it, finnery. The malthouses were much larger than those in Hertfordshire, but kept much closer, which is no doubt one of the causes of the malt becoming mouldy. The use of watering is held to be an increase of measure, which in one instance was said to be two bushels in twenty. The brewers, and a maltster who made chiefly for a considerable brewery, made their malt without watering it.

At many of these houses the frauds of short wetting had been extensively practised, and these frauds are evidently still considered as a source of very productive emolument annexed to the watering system. Notwithstanding the preference given to Hertfordshire malt, they urge no complaint on that head, but assert they are greatly injured by what is called ship malt on the coast, which is sold at an inferior price, which they allow can only arise from fraud and watering: admitting also that their own frauds have been suppressed, while the others are going on. (*Retrospect, No.* 13.)

To MALT. *v. n.* 1. To make malt. 2. To be made malt (*Mortimer*).

MA'LTDRINK. *s.* All *maltdrinks* may be boiled to a slimy syrup (*Floyer*).

MA'LTDUST. *s.* It is an enricher of barren land (*Mortimer*).

MA'LTFLOOR. *s.* A floor to dry malt (*Mortimer*).

MA'LTHORSE. *s.* A dull dolt (*Shaksp.*).

MA'LTMAN. MA'LTSTER. *s.* (from *malt.*) One who makes malt (*Swift*).

MALTA, an island in the Mediterranean, situated about fifty miles from the coast of Sicily. Anciently, it was called Iberia, afterwards Ogygia, and by the Greeks Melite, from which, at last, the Saracens formed the appellation of Malta. Its length is computed to be twenty miles, its greatest breadth twelve, and its circumference sixty miles. It is entirely rocky, and produces no more corn than barely suffices to maintain the inhabitants for six months. Many ship loads of earth have, indeed, been brought here from Sicily, and the rocky bottom covered therewith, in order to render it in some places more fruitful, but the soil has in a short time crumbled into dust, there being but little rain to preserve it in a proper adhesion. The wine produced in this island is not sufficient for its consumption, and it, also, is deficient in wood. On the other hand, it has fruits and cotton, a plenty of honey, good pastures, considerable fisheries, sea-salt, and a profitable coral fishery. Its annual revenues are computed at 76,000 scudi. The number of its inhabitants amounts in all to about 60,000. The common language of the country is a corrupt Arabic, but in towns Italian is spoken. The most ancient inhabitants of this island, of whom we have any account, were the Phœacians, who were driven out by the Phœnicians, and they in their turn by the Greeks. Afterwards it seems to have been under the dominion of the Carthaginians, from whom the Romans took it. Upon the declension of the Roman empire, it was first subdued by the Goths, then by the Saracens, but wrested from them by the Normans, in the year 1090, after which time it had the same masters as Sicily, till Charles V. gave it to the knights of St. John of Jerusalem, who had been successively driven from Palestine and Rhodes: in consequence of which they have been called the knights of Malta. Valetta is the capital. See VALETTA.

MALTA, MELITA, or CITTA VECCHIA, an ancient and strongly fortified city of the island of Malta. It is the residence of the bishop, and the cathedral is a very fine structure. Near this city are the catacombs, which are said to extend fifteen miles under ground; and a small church, dedicated to St. Paul, adjoining to which is a statue of the saint, with a viper in his hand, said to be placed on the spot where he shook the viper off, without having been hurt; and close to it is the grotto in which he was imprisoned. Malta is seated on a hill in the centre of the island, and was formerly twice as large as at present; for the new city, Valetta, being more conveniently situate, has drawn away the greater number of its inhabitants. This island is now in the possession of the British crown.

MALTA (Knights of), otherwise called Hospitalers of St. John of Jerusalem, a religious military order, whose residence is in the island of Malta, situated in the Mediterranean sea, upon the coast of Africa. The knights of Malta, so famous for defending Christendom, had their rise as follows.

Some time before the journey of Godfrey of Bouillon into the Holy Land, some Neapolitan merchants, who traded in the Levant, obtained leave of the caliph of Egypt to build an house for those of their nation who came thither on pilgrimage, upon paying an annual tribute.

Afterwards they built two churches, and received the pilgrims with great zeal and charity This example being followed by others, they founded a church in honour of St. John, and an hospital for the sick; whence they took the name of Hospitalers. A little after Godfrey of Bouillon had taken Jerusalem, in 1099, they began to be distinguished by black habits and a cross with eight points; and, besides the ordinary vows, they made another, which was to defend the pilgrims against the insults of the infidels. This foundation was completed in 1104, in the reign of Baldwin; and so their order became military, into which many persons of quality entered, and changed the name of hospitalers into that of knights.

When Jerusalem was taken, and the Christians lost their power in the East, the knights retired to Acre or Ptolemais, which they defended valiantly in 1290. Then they followed the king of Cyprus, who gave them Lamisson in his dominions, where they stayed till 1310. That same year they took Rhodes, under the grand-master Folques de Villaret, a Frenchman; and next year defended it against an army of Saracens: since which the grand-masters have used these four letters, F. E. R. T. i. e. "Fortitudo ejus Rhodum tenuit;" and the order was from thence called the knights of Rhodes.

In 1522, Soliman having taken Rhodes, the knights retired into Candia, and thence into Sicily. In 1530 Charles V. gave them the island of Malta, to cover his kingdom of Sicily from the Turks. In 1566, Soliman besieged Malta; but it was gallantly defended by the grand-master John de Valette Parisot, and the Turks obliged to quit the island with great loss.

The knights consisted of eight different languages or nations, of which the English were formerly the sixth; but at present they are but seven, the English having withdrawn themselves. In each language there are several grand priories, and capital bailiages. To each language belongs a hall, where the knights eat, and hold their ordinary assemblies. Each grand-prior has a number of commanderies.

The commanderies are either magisterial, or else by right, or, finally, by favour. The magisterial are those annexed to the grand-mastership, whereof there is one in each grand-priory. commanderies by right are those which come by right of seniority; their seniority is computed from the time of their admission; but they must first have lived five years at Malta, and have made four caravannes, or cruising voyages, on the Turks and Corsairs, commanderies by favour are those which the grand-master, or the grand-prior, have a right of conferring; one of these they confer every five years on whom they please. The noble knights are called knights by right; and none but these can be bailiffs, grand-priors, or grand-masters. Knights by favour are those, who, not being noble of themselves, are raised on account of some great exploit, or some noble service, into the rank of nobles.

The servitors, or serving-brothers, are of two kinds; 1. The servitors of war, whose functions are the same with those of the knights. 2. The servitors of religion, whose whole business is to sing the praises of God in the conventual church, and to officiate each in his turn as chaplain on board the vessels and gallies of the order.

The brothers of obedience are priests, who, without being obliged to go to Malta, take the habit of the order, make the vows, and attach themselves to the service of some of the churches of the order, under the command of a grand-prior or commander, to whom they pay obedience.

The knights of majority are those who, according to the statutes, are admitted at sixteen years of age. The knights of minority are those who are admitted from the time of their birth which, however, cannot be done, without a dispensation from the pope.

The chaplains can only be admitted regularly from ten to fifteen years of age: after fifteen, they must have a brief from the pope; till fifteen, the grand-master's letter is sufficient. These are called diacos, and must give proof of their being born of creditable families.

For the proofs of nobility to be made before the admission of knights, in the language of Germany, they go back six generations; in the rest it is sufficient to go back to the great grandfather on the father's or mother's side.

All the knights, after their profession, are obliged to wear a white cross, or star with eight points, over the cloak or coat, on the left-side, which is the proper habit of the order, the golden cross being only an ornament.

There are also female hospitalers of the order of St. John of Jerusalem, sometimes also called chevalieresses, or she-knights, of equal antiquity with the knights themselves; whose business was to take care of the women-pilgrims, in an hospital apart from that of the men. A few years ago the emperor of Russia took the order of Malta under his protection.

MALTHA, Μαλθη, in antiquity, denotes any cement, or glutinous body, which has the faculty of binding things together.

MALTHA, in mineralogy, a species of BITUMEN, which see.

MALTHACTICS (from μαλασσω, to soften.) Emollient medicines.

MALTHAXIS. (from μαλασσω, to soften.) Emollition; the art of making medicines or other substances soft.

MALTHOCODE, a term by which the Greek writers express the emollient topical remedies prepared with oil. Hippocrates expressly forbids the use of these in old ulcers.

MALTON, a town of the north-riding of Yorkshire, seated on the river Derwent, over which there is a good stone bridge. It is composed of two towns, the New and the Old; and is well inhabited, accommodated with good inns, and sends two members to parliament. Lon. 0. 40 W. Lat. 54. 9 N.

MALVA. Mallow. In botany, a genus of the class monadelphia, order polyandria. Calyx double, the outermost two or three-leaved; capsules numerous, one-seeded, disposed in a flat ring. Fifty-seven species; scattered over the globe; some with undivided leaves; the greater number with angular leaves. Four

of the species common to the wastes, hedges, and gravelly fields of our own country. We can only advert to a few.

1 M. sylvestris. Common mallow. Stem erect, herbaceous; leaves with seven sharpish lobes, peduncles and peticles hairy. Found in our hedges; and has a strong resemblance to the althæa, both in external character and medicinal virtues. It is principally used in fomentations, cataplasms, and emollient enemas.

2. M. alcea. Vervain mallow. Stem erect; lower leaves angular, upper ones five-parted and roughish; leaves of the outer calyx oblong, obtuse. A native of Germany; and employed medicinally in that country like M. sylvestris.

3 M crispa. Stem erect; leaves angular, curled: flowers axillary, clustered. A native of Germany. The fibres of the bark of this, and several species, macerated like those of hemp, afford a whiter and tougher woof than is obtained from hemp, and of course produces a more valuable cloth.

MALVERN (Great and Little), two small towns of Worcestershire, in which were formerly two abbeys. The gateway of the abbey of Great Malvern remains. Little Malvern stands in a cavity of the hills, which are lofty mountains, rising like stairs, one higher than another, for about seven miles; and present a very grand appearance from different parts of Worcestershire, Herefordshire, and Gloucestershire. The highest of these hills is 1313 feet above the surface of the Severn

Malvern water. This mineral water is classed amongst the simple cold waters. Its contents, as well as that of Holywell in the county of Flint, are some carbonic acid, a very small portion of earth, either lime or magnesia, united with the carbonic and marine acids; perhaps a little neutral alkaline salt, and a very large proportion of water Malvern water is principally employed externally in scrophulous inflammations of the eyes, and all cutaneous eruptions; internally it is prescribed in painful affections of the kidneys and bladder, attended with bloody, purulent, or fetid urine, irritating sores of the surface, and fistulas of long standing.

MALVA'CEOUS. *a.* (*malva*, Latin.) Relating to mallows.

MALVERSA'TION. *s.* (French.) Bad shifts; mean artifices

MALVEZZI (Virgilio marquis de), an Italian gentleman, born at Bologna, acquired great reputation by his learning and writings. He was well versed in polite literature, music, law, physic, and the mathematics. He served also in a distinguished post in the army of Philip IV. king of Spain and was employed by him in some important negotiations. He died at Bologna in the year 1654, leaving several works in Spanish and Italian. Among the latter are his Discourses on the First Book of Tacitus: this work has been translated into English.

MALUM MORTUUM. A disease that appears in the shape of a pustule, which soon forms a dry, brown, hard, and broad crust. It is seldom attended with pain, and remains fixed for a long time before it can be detached. It is mostly observed on the tibia and os coccygis, and sometimes on the face.

MALUNG, a town of Sweden, in the province of Dalecarlia, 55 miles W. of Fahlun. Lon. 15. 20 E. Lat. 60. 30 N.

MALWA, a province of Hindustan Proper, bounded on the W. by Guzerat, on the N. by Agimere, on the E. by Allahabad and Orissa, and on the S. by Candish. It is one of the most extensive, elevated, and diversified tracts in Hindustan; and is divided among the chiefs of the Poonah Mahrattas. Ougein and Indore are the principal towns.

MALZIEU, a town of France, in the department of Lozere, 20 miles N.N.W. of Mende.

MAM. Mamma'. *s.* (*mamma*, Latin.) The fond word for mother (*Prior*).

MAMALUKES, Mammelukes, or Mammalucks, the name of a dynasty, which reigned a considerable time in Egypt.

The word comes from מלך, *regere, imperare*, the Arabic participle whereof is ממלוך, *Mamluc*, which signifies subject, or one under the dominion of another. Scaliger holds, that the word is Arabic, and that it properly signifies something bought with money: but others will have it signify any thing acquired, either as prize or purchase.

The Mamalukes were originally Turkish and Circassian slaves, bought of the Tartars by Melechsaleh, to the number of a thousand; whom he bred up to arms, and raised some to the principal offices of the empire. They killed sultan Moadam in 1250, being affronted at his concluding a treaty with his prisoner St. Louis, without their privity. This Moadam was the last sultan of the Ajoubites; to whom succeeded the Mamalukes, the first of whom was sultan Azeddin, or Mouz Ibec, the Tourcoman.

Others say that the Mamalukes were ordinarily chosen from among the Christian slaves; and that they were the same thing, in great measure, with the Janizaries among the Turks. They never married. The first are said to have been brought from Circassia; and some add that they first began to be talked of about the year 869.

MAM'ILLÆ. (*mamilla*, dim. *mamma*, the breast.) In anatomy, the breasts of males It is likewise applied sometimes to the female nipple.

MAMMA. (*mamma*.) See Breast.

MAMMA'LIA. In zoology, the first class as arranged by Linnéus, comprising the seven orders primates, bruta, feræ, glires, pecora, belluæ, cete. It includes all those animals, as indeed its name imports, that suckle their young by the possession of a mammalian or mammary organ. In English we have no direct synonym for this term; quadruped or four-footed, which has usually been employed for this purpose, is truly absurd, since one of the orders have no feet whatever, and another offers one or two genera, that cannot with propriety be said to have more than two feet. We have

hence thought ourselves justified in vernaculizing the Latin term, and translating mammalia mammals, or breasted-animals.

MAMMA'RIA, in zoology, a genus of the class vermes, order mollusca. Body smooth, without cirri or rays; aperture single. Three species; all inhabitants of the Northern Ocean: of which the most worthy of notice is M. globulus; body globular, cinereous, not fixed, gelatinous with a very thin skin, about a line and a half in diameter: found on the Greenland shores, amongst the roots of fuci, and constitutes the chief food of the terebella cirrata.

MAMMARY ARTERIES. Arteriæ mammillares. The internal mammary artery is a branch of the subclavian, and gives off the mediastinal, thymal, and pericardiac arteries. The external mammary is a branch of the axillary artery.

MAMMARY VEINS. Venæ mammillares. These vessels accompany the arteries, and evacuate their blood into the subclavian vein.

MAMMEA. Mammee. In botany, a genus of the class polyandria, order monogynia. Calyx two-leaved; petals four: berry very large, three or four-seeded. Two species; one a native of Jamaica and South America; the other of Montserrat. The former a large tree with obtuse, striate, opposite oblong leaves; short peduncles, four-petalled corols, succeeded by a large, round, esculent fruit, of delicious flavour. The tree may be propagated by seeds, and reared in our own stoves.

MAMMEE. A delicious fruit, the produce of the Mammea Americana of Linnéus. They have a very grateful flavour when ripe, and are much cultivated in Jamaica, where they are generally sold in the markets for one of the best fruits of the island.

MAMMEE-SAPOTA, in botany. See ACHRUS.

MA'MMET. s. (from *mam* or *mamma*.) A puppet; a figure dressed up (*Shakspeare*).

MA'MMIFORM. a. (*mamma* and *forma*, Latin.) Having the shape of paps or dugs.

MAMMI'LLARY. a. (*mammillaris*, Lat.) Belonging to the paps or dugs.

MA'MMOCK. s. A shapeless piece (*James*).

To MA'MMOCK. v. a. (from the noun.) To tear; to break; to pull to pieces (*Shakspeare*).

MAMMON, the god of riches, according to some authors; though others deny that the word stands for such a deity, and understand by it only riches themselves. Our Saviour says, We *cannot serve God and mammon*: that is, be religious and worldly-minded at the same time. Our poet Milton, by poetic licence, makes Mammon to be one of the fallen angels, and gives us his character in the following lines.

> Mammon, the least erected spirit that fell
> From heav'n: for ev'n in heav'n his looks and thoughts
> Were always downward bent; admiring more
> The riches of heav'n's pavement, trodden gold,
> Than aught divine or holy else enjoy'd
> In beatific vision: by him first
> Man also, and by his suggestion taught,
> Ransack'd the centre, and with impious hands
> Rifled the bowels of their mother earth
> For treasures better hid. Soon had his crew
> Open'd into the hill a spacious wound,
> And digg'd out ribs of gold. Let none admire
> That riches grow in hell; that soil may best
> Deserve the precious bane.

MAMMOTH, in zoology. See MEGATHERIUM.

MAMRE, an Amorite, brother of Aner and Eschol, and friend of Abraham (Gen. xiv. 13.). It was with these three persons, together with his own and their domestics, that Abraham pursued and overcame the kings after their conquest of Sodom and Gomorrah. This Mamre, who dwelt near Hebron, communicated his name to great part of the country round about. Hence we read (ch. xiii. 18. xxiii. 17, &c.), that Abraham dwelt in Mamre and in the plain of Mamre. But it is observed, that what we translate the *plain*, should be rendered the *oak*, of Mamre, because the word *elon* signifies an *oak* or *tree of a long duration*.

MAMURIUS VETURIUS, a worker in brass in Numa's reign. He was ordered by the monarch to make a number of ancylia or shields, like that one which had fallen from heaven. (See ANCILIA.) He was very successful in his undertaking, and he asked for no other reward, but that his name might be frequently mentioned in the hymns which were sung by the Salii in the feast of the Ancylia. This request was granted.

MAN. s. (man, mon, Saxon.) 1. Human being (*Creech*). 2. Not a woman (*Shaksp.*). 3. Not a boy (*Dryden*). 4. A servant; an attendant (*Cowley*). 5. A word of familiar address, bordering on contempt (*Shakspeare*). 6. It is used in a loose signification like the French *on*, one, any one: as, *though a* man *be wise he may err* (*Addison*). 7. One of uncommon qualifications (*Addison*). 8. A human being qualified in any particular manner (*Samuel*). 9. Individual (*Watts*). 10. Not a beast (*Creech*). 11. Wealthy or independent person (*Tillotson*). 12. A moveable piece at chess or draughts. 13 MAN *of war*. A ship of war.

MAN, in zoology. See the articles HOMO, PHYSIOLOGY, LIFE, and ZOOLOGY.

From the superiority of his organization when compared with all other vital organized beings, man may justly place himself at the head of the visible creation. His form is erect, his power is pre-eminent; his passions are within the range of his own discipline; his happiness is not confined to things of sense; his knowledge is progressive, and his duration is eternal.

In contemplating him anatomically and chemically we find the animal machine governed by three principal regulators: respiration, which by producing in the lungs, and perhaps in other parts of the system, a slow combustion of the hydrogen and carbon contained in the blood, excites a discn-

gagement of caloric absolutely necessary to the support and existence of his animal heat: perspiration, which by occasioning a loss of the perspirable humour, facilitates the disengagement of a certain quantity of caloric necessary to the solution of this humour in the surrounding air; and consequently prevents, by the continual coldness this disagreement produces, the individual from receiving a degree of heat or perspiration superior to what is fixed by nature: and digestion, which by furnishing the blood with water, hydrogen and carbon, restores habitually to the animal machine what it loses by respiration and perspiration, and afterwards rejects externally substances that are hurtful or superfluous to it.

If the causes which affect man are various his resources are equally multiplied: his temperament is either adapted for motion or repose, for abstinence or excess of nourishment. Similar circumstances permit him to pass from an active to a tranquil life, according to his necessities or his will. If he be in a state of inaction and repose, the circulation is slow as well as the respiration, he consumes less air, exhales less carbon and hydrogen from the lungs, and consequently has less need of nourishment. If he be obliged to work hard, the respiration is accelerated; he consumes more air, loses more hydrogen and carbon, and consequently has need of oftener repairing what is lost, by a greater quantity of nutrition. In running, dancing, and all violent exercises, whatever acceleration the respiration and circulation undergo, or whatever increase there is in the consumption of air, of hydrogen and carbon, the equilibrium of the animal economy is not disturbed, whilst the aliments more or less digested, always more or less in reserve in the intestinal canal, supply their loss: but if the expence made by the lungs be greater than the receipt made by nutrition, the blood is deprived by degrees of its hydrogen and carbon, and disease succeeds. In this case the animal is advised of the danger by lassitude or loss of vigour, and finds the necessity of re-establishing the equilibrium by nourishment and repose. The contrary takes place for want of motion and exercise, or the use of certain aliments, or any imperfection or vice in the organs of nutrition or respiration. In these cases the digestion introducing into the blood more matter than the respiration can consume, an excess of carbon or of hydrogen, or of both, takes place in the mass of blood. Nature at such time strives against such an alteration in the humours; and if she cannot recover the equilibrium by a more frequent respiration, disease is the consequence.

Whilst we merely consider the consumption of air in respiration, the lot of the rich and the poor is equal, for the air belongs to all and costs nothing: the labourer, from his greater energy, enjoys more completely this gift of nature, for he drinks larger draughts of it, and relishes it with a higher zest: but since experience has proved respiration to be a real combustion, that consumes at each instant a portion of our substance, that this consumption is increased in proportion as the circulation and respiration are accelerated, and of course in proportion to the more laborious and active life of the individual; a multitude of moral reflections force themselves upon the mind with queries that it is not perhaps easy to answer at first sight. Why should the poor man, who lives by the sweat of his brow, and is obliged to expend the force which nature allots him, consumes more of his individual substance than his richer and idler neighbour, whilst at the same time this last has less need of repairing? Why should the rich man enjoy an abundance which is not physically necessary for him, and which would seem to be destined for the daily labourer? Let us not however calumniate nature: these are evils for which human institutions alone are answerable, and with which she has no concern: they are also evils which are in themselves an operation of very extensive good; and prove the wisdom of the institutions to which they owe their birth.

This result of forces continually varying and continually poising each other, and which are every moment in the animal economy, is truly to be admired. Man in this respect has been more favoured by nature than any other animal: he lives equally in all temperatures and in all climates: if he finds himself in a cold climate, the contact of the air with the lungs, from its greater density, becomes more considerable: more air is decomposed, more caloric disengaged, which repairs the loss produced by the external cold; at the same time that the perspiration diminishes, evaporation grows less, and hence the cold itself becomes more temperate. If he pass into a hot climate the contrary effect takes place. The air being less dense, its contact with the blood becomes less considerable: less air is decomposed, less caloric disengaged, a more abundant perspiration established, and a greater quantity of heat taken away: and in this manner is it that an almost uniform degree of heat is observed in animals that breathe, which is about 32° of Reaumur, or 98° of Fahrenheit.

MAN, in animal chemistry, is compounded of solids, fluids, a vital principle, and, what distinguishes him from every other animal, a soul.

The solids are divided into hard and soft, which analysis demonstrates to be formed of earthy particles, connected together by an intermediate gluten. The hard parts are the bones and cartilages. The soft parts, muscles, nerves, the viscera, and every other part except the fluids. The fluids are very various. See FLUIDS. Anatomy demonstrates the structure of the various parts of which the human body consists: these the reader will find under their respective heads, as muscles, bones, cartilages, &c. and of late great progress has been made towards ascertaining, by chemical criteria, its principles and elements. The constituent principles of man are, 1. The water, which constitutes the greatest part of the humours, and is the vehicle of the other principles. 2. The animal gass, which consists of carbonated hydrogenæ, and is found not only in the blood, but in all the other fluids. 3. The inflammable gass, emitted from the large intestines, *in flatu*. 4. The animal gluten, which consists of carbone, and azot, and forms the fibres of the solid parts; the caseous portion of the milk; and the cruor of the blood. 5. The albumen, present in the serum of the blood. 6. The jelly, found in the serum of the blood; lymph of the lymphatic vessels, and other fluids; and the interstices of all the fibres. 7. The cruor, which is the animal gluten impregnated with oxydated iron. 8. The mucus, which lubricates the primæ viæ; the aerial surfaces of the lungs; the parts of generation, and urinary passages. 9. The animal oil, which fills the cells of the adipose membrane. 10. The resin, found in the bile. 11. The sebacic acid, which is present in animal oil. 12. The phosphoric acid, which enters into the composition of the animal earth of the bones, and the phosphorated salts of

the urine. 13. The lactic acid, in the sugar of the serum of the milk. 14. The sugar, latent in the serum of the milk. 15. The animal earth, which is a phosphorated calx, and not only forms the greatest part of the bones, but also is found in the fibres of the soft parts, and in all the fluids. 16. Phosphorated volatile alkali, and 17. Phosphorated soda, both of which are detected in the urine. 18. Culinary salt, obtained from the urine, gastric juice, semen, and other humours.

The elementary principles of our body hitherto known are, 1. Azot, an element which combined with hydrogene constitutes volatile alkali; with the matter of heat, azotic air; with carbon, the gluten of animal fibres. Azot is the primary element of the animal body, for it may be extracted from almost every part of the animal, by means of the nitrous acid, this having a greater affinity with the elements than the azot itself. The mucus, jelly, membranes, tendons, ligaments, and cartilages, afford it in a less degree by means of the nitrous acid. The lymph, serum of the blood, the water of hydropic patients, the liquor amnii, and cheese, give out more. The greatest quantity of azot is obtained from the coagulable lymph of the blood, and from muscle. The flesh of young animals contain less than that of old; and it is in greater quantity in sarcophagous, than in the flesh of phytophagous animals and fish. It is not probable that the azot is produced by the decomposition of the nitre; for after having performed the separation, it is capable of saturating the same quantity of salt of tartar as before. 2. The matter of heat, which enters into the composition of both solids and fluids, and which, in a separate form, constitutes the animal heat. 3. The matter of light, which in its free state produces vision, and, when compounded, enters as an element into the composition of oil and all other inflammable parts. The eyes of animals, which shine in the night-time, owe this property to the matter of light. 4. The electric matter, which enters into all bodies, and affords the phenomena of animal electricity. 5. Oxygen, which, in combination with the matter of heat, constitutes vital air; with hydrogen, forms water; with acescent bases, the acid salts of our fluids. 6. Hydrogen, which, combined with oxygen, forms water; with azot, volatile alkali; with the matter of heat, inflammable air, which is emitted from the large intestines; and with carbon, animal gass: and lastly, combined with carbon and the sebacic acid, constitutes the oil of the adipose membrane. 7. Carbon, which, in combination with hydrogene and the sebacic acid, constitutes the oil of the adipose membrane; with hydrogen alone, animal gass; with azot, animal gluten. 8. Sulphur, which, combined with inflammable air, constitutes the hepatic air, that exhales from muscular fibres, hair, incubated eggs, animal gluten, and, according to Lavoisier, human excrement. 9. Phosphorus, which, with oxygen, forms the phosphoric acid; and, with inflammable air, phosphoric air. The lucid sweat of some men, the phosphorescence or light given out by the putrifying bodies of some animals, and the phosphorus obtained from cheese and human bones, sufficiently shew that phophorus constitutes an element of our body. 10. Soda, or the fixed mineral alkali. 11. Potash, or the fixed vegetable alkali. Each of these is found in several of the fluids of the human body. 12. An earthy element. Of the earths, no kind is so frequently detected as the calcareous, which is found in the bones and other parts. 13. A metallic element. Of so great a number of metals, iron and manganese alone are found in an organized body, whether animal or vegetable. Iron is in greater quantity in the flesh than in the bones; but in the greatest proportion in the cruor or red part of the blood. 14. An odorous principle, perceptible in all the animal fluids; but of a peculiar kind in the human urine and excrements. 15 The nervous fluid, contained in the nerves, and which appears to be an element *sui generis*, distinct from all known fluids, and not to be collected by art. 16. The vital principle. In all solid and fluid parts of a living body there exists an element, with properties peculiar to itself, which constitutes life; hence it is justly called vital. This principle induces a mode of union in the other elements, widely differing from that which arises from the common laws of chemical affinity. By the aid of this principle nature produces the animal fluids, as blood, bile, semen, and the rest, which can never be produced by the art of chemistry. But if, in consequence of death, the laws of vital attraction or affinity cease to operate, then the elements, recovering their former properties, become again obedient to the common laws of chemical affinity, and enter into new combinations, from which, new principles, or the production of putrefaction, are produced. Thus the hydrogen, combining itself with the azot, forms volatile alkali; and the carbonated hydrogen, with the azot, putrid air, into which the whole body is converted. It also appears from hence, why organized bodies alone, namely animal and vegetable, are subject to putridity; to which inorganic or mineral substances are in no degree liable, the latter not being compounded according to the laws of vital affinity, but only according to those of chemical affinity. For the fatiscense or resolution of the pyrites or ferrum sulphuratum in the atmospheric air, is not putrefaction, but only the oxygen, furnished by the air, combining with the sulphur, and forming sulphuric acid. Fire, as well as putridity, separates the constituent principles of animal bodies into their elements; but these, by a peculiar law, under the action of fire again combine in a peculiar manner, and form peculiar constituent principles, called the products of fire. Thus the hydrogen, combining with azot, is changed into volatile alkali; but with a large proportion of carbon, it forms empyreumatic oil. From what has hitherto been said, it will also appear, that the true constituent principles of an animal body cannot be detected either by putrefaction or the action of fire; for by these means we only discover the elements of those principles. Upon this subject see the article BLOOD.

MAN (Varieties of), See HOMO.

We resume the subject here, because as infidel ignorance is perpetually pretending, that the diminutive Icelanders, the ugly Esquimaux, the woolly-headed Negro, and the copper-coloured American, could not have descended from one original pair, either of European complexion or of Hindu symmetry—it may not be improper, in this place, to shew the weakness of this popular objection to the Mosaic history of the origin of man. This has been done in so satisfactory a manner by professor Blumenbach, that we have nothing to do but to lay his observations before our readers, convinced, as we are, that they are intelligible to every capacity, and that they will

carry conviction to all who are not the slaves of prejudice.

"Some late writers on natural history (says the professor) seem doubtful whether the numerous distinct races of men ought to be considered as mere varieties, which have arisen from degeneration, or as so many species altogether different. The cause of this seems chiefly to be, that they took too narrow a view in their researches; selected, perhaps, two races the most different from each other possible, and, overlooking the intermediate races that formed the connecting links between them, compared these two together; or, they fixed their attention too much on man, without examining other species of animals, and comparing their varieties and degeneration with those of the human species. The first fault is, when one, for example, places together a Senegal negro and an European Adonis, and at the same time forgets that there is not one of the bodily differences of these two beings, whether hair, colour, features, &c. which does not gradually run into the same thing of the other, by such a variety of shades, that no physiologist or naturalist is able to establish a certain boundary between these gradations, and consequently between the extremes themselves.

"The second fault is, when people reason as if man were the only organised being in nature, and consider the varieties in his species to be strange and problematical, without reflecting that all these varieties are not more striking or more uncommon than those with which so many thousands of other species of organised beings degenerate, as it were, before our eyes."

As what we have said under the article Homo may be sufficient to warn mankind against the first error, and at the same time to refute it, we hasten to refute the second by our author's comparison between the human race and that of swine.

"More reasons (says he) than one have induced me to make choice of swine for this comparison; but, in particular, because they have a great similarity, in many respects, to man: not, however, in the form of their entrails, as people formerly believed, and therefore studied the anatomy of the human body purposely in swine; so that, even in the last century, a celebrated dispute, which arose between the physicians of Heidelberg and those of Durlach, respecting the position of the heart in man, was determined, in consequence of orders from government, by inspecting a sow, to the great triumph of the party which really was in the wrong. Nor is it because in the time of Galen, according to repeated assertions, human flesh was said to have a taste perfectly similar to that of swine; nor because the fat, and the tanned hides of both, are very like to each other; but because both, in regard to the economy of their bodily structure, taken on the whole, shew unexpectedly, on the first view, as well as on closer examination, a very striking similitude.

"Both, for example, are domestic animals; both *omnivora*; both are dispersed throughout all the four quarters of the world; and both consequently are exposed, in numerous ways, to the principal causes of degeneration arising from climate, mode of life, nourishment, &c.; both, for the same reason, are subject to many diseases, and, what is particular worthy of remark, to diseases rarely found among other animals than men and swine, such as the stone in the bladder; or to diseases exclusively peculiar to these two, such as the worms found in measled swine.

"Another reason (continues he) why I have made choice of swine for the present comparison is, because the degeneration and descent from the original race are far more certain in these animals, and can be better traced, than in the varieties of other domestic animals. For no naturalist, I believe, has carried his scepticism so far as to doubt the descent of the domestic swine from the wild boar; which is so much the more evident, as it is well known that wild pigs, when caught, may be easily rendered as tame and familiar as domestic swine: and the contrary also is the case; for if the latter by any accident get into the woods, they as readily become wild again; so that there are instances of such animals being shot for wild swine; and it has not been till they were opened, and found castrated, that people were led to a discovery of their origin, and how, and at what time, they ran away. It is well ascertained, that, before the discovery of America by the Spaniards, swine were unknown in that quarter of the world, and that they were afterwards carried thither from Europe. All the varieties, therefore, through which this animal has since degenerated, belong, with the original European race, to one and the same species; and since no bodily difference is found in the human race, as will presently appear, either in regard to stature, colour, the form of the cranium, &c. which is not observed in the same proportion among the swine race, while no one, on that account, ever doubts that all these different kinds are merely varieties that have arisen from degeneration through the influence of climate, &c. this comparison, it is to be hoped, will silence those sceptics who have thought proper, on account of these varieties in the human race, to admit more than one species.

"With regard to stature, the Patagonians, as is well known, have afforded the greatest employment to anthropologists. The romantic tales, however, of the old travellers, who give to these inhabitants of the southern extremity of America a stature of ten feet and more, are scarcely worth notice; and even the more modest relations of later English navigators, who make their height from six to seven feet, have been doubted by other travellers, who, on the same coast, sought for such children of Enoch in vain. But we shall admit every thing said of the extraordinary size of these Patagonians by Byron, Wallis, and Carteret; the first of whom assigns to their chief, and several of his attendants, a height of not less than seven feet, as far as could be determined by the eye; the second, who asserts that he actually measured them, gives to the greater part of them from 5 feet 10 inches to 6 feet; to some 6 feet 5 inches, and 6 feet 6; but to the tallest, 6 feet 7 inches: and this account is confirmed by the last-mentioned of the above circumnavigators. Now, allowing this to be the case, it is not near such an excess of stature as that observed in many parts of America among the swine, originally carried thither from Europe; and of these I shall mention in particular those of Cuba, which are more than double the size of the original stock in Europe.

"The natives of Guinea, Madagascar, New Holland, New Guinea, &c. are black; many American tribes are reddish brown; and the Europeans are white. An equal difference is observed among swine in different countries. In Piedmont, for example, they are black. When I passed

(says our author) through that country, durin the great fair for swine at Salenge, I did not see a single one of any other colour. In Bavaria, they are reddish brown; in Normandy, they are all white.

"Human hair is, indeed, somewhat different from swine's bristles; yet, in the present point of view, they may be compared with each other. Fair hair is soft, and of a silky texture; black hair is coarser, and among several tribes, such as the Abyssinians, Negros, and the inhabitants of New Holland, it is woolly, and most so among the Hottentots. In the like manner, among the white swine in Normandy, as I was assured by an incomparable observer, Sulzer of Ronneburg, the hair on the whole body is longer and softer than among other swine; and even the bristles on the back are very little different, but lie flat, and are only longer than the hair on the other parts of the body. They cannot, therefore, be employed by the brush-makers. The difference between the hair of the wild boar and the domestic swine, particularly in regard to the softer part between the strong bristles, is, as is well known, still greater.

"The whole difference between the cranium of a Negro and that of a European is not in the least degree greater than that equally striking difference which exists between the cranium of the wild boar and that of the domestic swine. Those who have not observed this in the animals themselves need only to cast their eye on the figure which Daubenton has given of both.

"I shall pass over (says our author) less national varieties which may be found among swine as well as among men, and only mention that I have been assured by Mr. Sulzer, that the peculiarity of having the bone of the leg remarkably long, as is the case among the Hindus, has been remarked with regard to the swine in Normandy. 'They stand very long on their hind legs (says he, in one of his letters), their back, therefore, is highest at the rump, forming a kind of inclined plane; and the head proceeds in the same direction, so that the snout is not far from the ground.' I shall here add, that the swine, in some countries, have degenerated into races which in singularity far exceed every thing that has been found strange in bodily variety among the human race. Swine with solid hoofs were known to the ancients, and large herds of them are found in Hungary, Sweden, &c. In the like manner, the European swine, first carried by the Spaniards, in 1509, to the island of Cuba, at that time celebrated for its pearl fishery, degenerated into a monstrous race, with hoofs which were half a span in length." Phil. Mag. vol. iii.

From these facts, our author concludes, that it is absurd to allow the vast variety of swine to have descended from one original pair, and to contend that the varieties of men are so many distant species.

To MAN. *v. a.* (from the noun.) 1. To furnish with men (*Daniel*). 2. To guard with men (*Shakspeare*). 3. To fortify; to strengthen (*Milton*). 4. To tame a hawk (*Shakspeare*). 5. To attend; to serve; to wait on as a servant (*Ben Jonson*). 6. To direct in hostility; to point (*Shakspeare*).

MAN (Isle of), an island in the Irish sea, lying about seven leagues north from Anglesey, about the same distance west from Lancashire, nearly the like distance south-east from Galloway, and nine leagues east from Ireland. Its form is long and narrow, stretching from the north-east of Ayre-point to the Calf of Man, which lies south-west, at least 30 English miles. Its breadth in some places is more than nine miles, in most places eight, and in some not above five, and contains about 160 square miles.

The first author who mentions this island is Cæsar; for there can be as little doubt, that, by the Mona, of which he speaks in his Commentaries, placing it in the midst between Britain and Ireland, we are to understand Man, as that the Mona of Tacitus, which he acquaints us had a fordable strait between it and the continent, can be applied only to Anglesey. Pliny has set down both islands: Mona, by which he intends Anglesey, and Monabia, which is Man. In Ptolemy we find Monaæda, or Monaida, that is, the farther or more remote Mön. Orosius styles it Menavia; tells us, that it was not extremely fertile; and that this, as well as Ireland, was then possessed by the Scots. Beda, who distinguishes clearly two Menavian islands, names this the northern Menavia, bestowing the epithet of southern upon Anglesey. In some copies of Nennius, this isle is denominated Eubonia; in others Menavia; but both are explained to mean Man. Alured of Beverley also speaks of it as one of the Menavian islands. The Britons, in their own language, called it Manaw, more properly Main au, *i. e.* "a little island," which seems to be latinized in the word Menavia. All which clearly proves, that this small isle was early inhabited, and as well known to the rest of the world as either Britain or Ireland.

The soil is very different; towards the south it is as good as can be desired. The mountains are cold, and consequently less fruitful. The valleys between them afford as good pasture, hay, and corn, as in most other places. Towards the north, indeed, there is a dry, barren, sandy earth, but capable of improvement. A large tract of land, called the Curragh, was formerly a bog, but since it has been drained, it is one of the richest parts of the island; and though the peat is six, eight, or ten feet deep, yet by good husbandry they have got a surface which will bear the plough. And the same place supplies the neighbourhood both with bread and fuel. In this place have been found very large trees of oak and fir, some two feet and a half in diameter, and forty feet long, supposed by the inhabitants to have lain here ever since the deluge. The oaks and fir do not lie promiscuously; but where is plenty of one sort, there are generally few or none of the other. A high ridge of mountains runs almost the length of the island, which supplies the inhabitants quite round with water and fire. Abundance of little rivulets and springs of excellent water (by the sides of which the inhabitants have for the most part built their houses) run hence to the sea, and the sides of the moun-

tains are stored with heath, and an excellent peat for fuel. The highest of these mountains is called Snafield; its height, as taken by an exact barometer, being about 580 yards; the mercury subsiding two inches and one-tenth. From the top of this mountain they have a fair prospect of England, Scotland, Ireland, and Wales. The air is sharp and cold in winter; but in all such places as have a natural shelter, or an artificial one from trees, the air is as mild as in Lancashire; the frosts being short, and the snow not lying long on the ground, especially near the sea. The black cattle and horses are generally less than those of England; but as the land improves, so do these, and of late there have been some bred here as large as in other places. Of several noxious animals, such as badgers, foxes, otters, filmerts, moles, hedge-hogs, snakes, toads, &c. the inhabitants. in the time of bishop Wilson, from whom this account is taken, knew no more than their names; as also several birds, such as the woodpecker, the jay, the maup, &c. And it is not long since a person, more fanciful than prudent or kind to his country, brought in a breed of magpies, which have increased incredibly, so as to become a nuisance; and only a few years since somebody brought in frogs, which they say increase very fast. There are not many quarries of good stone: but one there is near Castle Town, which yields a tolerably good black marble, fit for tomb-stones, &c. There are also a good many quarries of a blue, thin, light slate, one of the best coverings for houses; of which great quantities are exported. Mines of coal there are none, though several attempts have been made to find them. But of lead, copper, and iron, there are several, and some of them have been wrought to good advantage, particularly the lead, of which ore many hundred tons have lately been smelted, and exported. This island has had many masters.—The Norwegians conquered this when they made themselves masters of the Western Isles, which they sent kings to govern, who generally chose the Isle of Man for their residence. This continued until 1266, when there was a very solemn agreement made between Magnus IV. of Norway, and Alexander III. of Scotland, by which this isle, among the rest, was surrendered to the Scots for 4000 marks, to be paid in four years, and 100 marks yearly; and, pursuant to this, Alexander drove out the king of Man, in the year 1270, and united it to Scotland. In 1312, there was a second agreement between Hacquin V. and Robert I. of Scotland; and in 1426, a third agreement, all of which are set down at large in Torfeus's History of the Orcades. But before this last agreement, the island was in the possession of John lord Stanley and of Man, who had it given him by Henry IV. in 1405. However, forasmuch as by the last agreement between the kings of Norway and Scotland, the latter claimed a right to this island, the lords of Man were obliged to keep a constant standing army and garrisons for the defence of it, till the reign of king James I. of England. And in this honourable house it continued to the year 1739, except for twelve years during the civil wars, when it was given by the parliament to the lord Fairfax; but it returned to its ancient lords at the restoration. After which it came to the duchess of Athol, the daughter of the earl, as a barony in fee. The lord sends a governor, lieutenant, or captain, who constantly resides at Castletown, where he has a handsome house, salary, and other conveniences benttiug his station. He is to take care that all officers, civil and military, discharge their trusts and duty. He is chancellor, and to him there is an appeal in matters of right and wrong, and from him to the lord, and, finally (if occasion be) to the king of England, in council. By act of parliament, 1765, the island and lordship of Man, and all the islands and lordships, royalties and regalities, and franchises, liberties, and seaports to the same belonging, and all other the hereditaments and premises granted by the several letters patent to the family of Derby, &c. shall be unalienably vested in his majesty and successors, excepting and reserving to the duke of Athol and his heirs the patronage of the bishopric of the Isle of Man, or of the bishoprics of Sodor and Man, the temporals of the same when vacant, and all other patronages and ecclesiastical benefices within the island; also reserving the landed property, with all rights in or over the soil, as lords of the manor, with all courts baron, rents, services, and other incidents to such courts belonging, wastes, commons, and other lands, inland water, fishings, mills, mines, and minerals; and also reserving the honorary service of rendering to his majesty's heirs and successors, kings and queens of England, two falcons on the days of their respective coronations. By an abstract of the clear revenue of Man, from 1754 to 1763, the medium was 7293l. 0s. 6d. per annum; of which the land revenue for the last year was 1409l. 17s. 6d.; and the income of the lands in the hands of the lord of the isle 107l. The principal towns are Castle-Town, Peel, Douglas, and Ramsey. The commodities of this island are black cattle, and coarse woollen cloth, hides, skins, honey, and tallow. The Isle of Man was converted to the Christian faith by St. Patrick, about the year 440, at which time the bishopric of Man was erected. The bishops are barons of the island, and have a seat, though not a voice, in the English house of peers.

Man of war. See Ship.

Man of war bird. See Pelicanus.

MANACHIA, or Magnisa, the ancient Magnesia, a town of Natolia Proper, with a bishop's see, and a castle. It was formerly the capital of the Ottoman empire, and is seated at the foot of a mountain, on the river Sarabat, 22 miles N. of Smyrna. Lon. 27.25 E. Lat. 38.45 N.

MA'NACLES. *s.* (*manicæ*, from *manus*, Lat.) Chain for the hands; shackles. (*Ecclus*).

To Ma'nacle. *v. a.* (from the noun). To chain the hands; to shackle (*Shakspeare*).

To MA'NAGE. *v. a.* (*menager*, French.) 1. To conduct; to carry on (*Stillingfleet*). 2. To train a horse to graceful action (*Knolles*).

3. To govern; to make tractable (*Arbuthnot*). 4. To wield; to move or use easily (*Newton*). 5. To husband; to make the object of caution (*Dryden*). 6. To treat with caution or decency (*Addison*).

To MA'NAGE. *v. n* To superintend affairs; to transact (*Dryden*).

MA'NAGE. *s.* (*menage*, French.) 1. Conduct; administration (*South*.) 2. Use; instrumentality (*Bacon*) 3. Government of a horse (*Peachham*). 4. Discipline; governance (*L'Estrange*.)

MANAGE, or MENAGE. An academy, riding-school, or other place for learning to ride the great horse; as also for breaking horses into their proper paces, motions and actions.—Every manage has a central spot for regulating the round or volts in which the practise or tactique of the manage consists, to which center a pillar is affixed. To this pillar horses are occasionally fastened in their first lessons. There are other pillars also placed in pairs at the sides of the manage, for the more perfect completion of the art. The manage may be divided into the greater and the less; or, as a modern writer has denominated them, "the grand and petit manage: the former constituting the management of the great horse, intended purely for the purposes of parade; the latter, confined solely to military tactics. The grand manage consists in teaching a horse, already perfectly broken in the common way, certain artificial motions, the chief of which are called the terra a terra, demi-volt, corvet, capriole, croupade, balotade, and the step and leap; which last is a motion compounded of three airs; the terra a terra, corvet, and the leap. When a horse is perfect in all these, he is styled a full dressed, or managed horse.

The petit manage is that drilling, or training, by which the army riding-masters fit the horse for military service in the ranks. The chief objects of it are, to set him upon his haunches, and make him rein well; to give him a cadenced pace; to teach him to rein back, or retreat; to move sideways, to stand fire, and to leap. After these a horse will soon become capable of all the necessary military evolutions. The common business of our town riding-schools is to teach grown gentlemen and ladies, and to set ill-broken horses upon their haunches. It is well known that the grand menage has been long out of fashion in this country; and farther, that it has for years past been upon the decline in every other. In truth it is a mere relict of that superstition in all things which is the characteristic of barbarous times. It is unnecessary to any good or useful purpose, because all such, whether of parade or business, may be fully answered by the common, rational, and uninjurious management; while there is always more or less cruelty practised in completing the full-dressed horse; such, for instance, as severe whippings, the meaning of which the horse cannot possibly comprehend, and which are therefore unnatural and illegitimate; the labour and irritation also are excessive; and, after all, the natural paces of the horse are spoiled, and he is rendered unfit for common business; the only compensation for which is, that he has learned sundry harlequin tricks; two of which are, to skip like a goat, and kick up behind like an ass."

MA'NAGEABLE. *a.* (from *manage*.) 1. Easy in the use (*Newton*). 2. Governable; tractable.

MA'NAGEABLENESS. *s.* (from *manageable*). 1. Accommodation to easy use (*Boyle*). 2. Tractableness; easiness to be governed.

MA'NAGEMENT. *s.* (*menagement*, Fr.) 1. Conduct; administration (*Swift*). 2. Prudence; cunning practice (*Dryden*). 3. Practice; transaction; dealing (*Addison*).

MA'NAGER. *s.* (from *manage*.) 1. One who has the conduct or direction of any thing (*South*). 2. A man of frugality; a good husband (*Dryden*).

MA'NAGERY. *s.* (*menagerie*, French.) 1 Conduct; direction; administration (*Clarendon*). 2. Husbandry; frugality (*Decay of Piety*). 3. Manner of using (*Decay of Piety*).

MANAR, an island of the East Indies, on the east coast of the island of Ceylon. The Portuguese got possession of it in 1560; the Dutch took it from them in 1658; and the English took it from the Dutch in 1795.—Lon. 80. 45 E. Lat. 9. 0 N.

MANASSEH (in Scripture hist.), the eldest son of Joseph, and grandson of the patriarch Jacob (Gen. xli. 50, 51.), was born in the year of the world 2290, before Jesus Christ 1714. The tribe descended from him came out of Egypt, in number 32,200 men, fit for battle, upwards of 20 years old, under the conduct of Gamaliel, son of Pedahzur (Numb. ii. 20, 21.). This tribe was divided at their entrance into the land of Promise. One half had its portion beyond the river Jordan, and the other half on this side the river.

MANASSEH, the 15th king of Judah, being the son and successor of Hezekiah. His acts are recorded in 2 Kings xx. xxi. and 2 Chr. xxxiii.

MANATI, in amphibiology. See TRICHECHUS.

MANA'TION. *s.* (*manatio*, Latin.) The act of issuing from something else.

MANATOULIN, a chain of islands on the N. side of Lake Huron, in N. America, extending about 100 miles in length, and eight in breadth. The name signifies a place of spirits; and they are held sacred by the Indians.

MANCA, was a square piece of gold coin, commonly valued at 30 pence; and mancusa was as much as a mark of silver, having its name from the manu cusa, being coined with the hand (*Leg. Canut*). But the manca and mancusa were not always of that value; for sometimes the former was valued at six shillings, and the latter, as used by the English Saxons, was equal in value to our half crown.

MANCANDO. (Ital.) In music, a word implying that the passage over which it is written is to be sung or played with a decreasing sound See DIMINUENDO.

MANCESTER, a village in Warwickshire, near Atherstone and the river Anker. It was a Roman station on the Watling-street, and here several coins have been dug up.

MANCHA, a territory of Spain, in New Castile, between the river Guadiana and Andalusia. It is a mountainous country; and it was here that Cervantes made his hero, Don Quixote, perform his chief exploits.

MANCHE, or CHANNEL, a department of France, including part of the late province of Normandy. It is almost surrounded by the English Channel, and Coutances is the capital.

MANCHE is sometimes used for a sleeve.

MANCHESTER, a town of Lancashire in England, situated in W. lon. 2. 42. N. lat. 53. 29. Mr. Whitaker conjectures, that the station was first occupied by the Britons about 500 years B. C. but that it did not receive any thing like the form of a town till 450 years after, or 50 years B. C. when the Britons of Cheshire made an irruption into the territories of their southern neighbours, and of consequence alarmed the Sestuntii, or inhabitants of Lancashire, so much, that they began to build fortresses in order to defend their country. Its British name was *Mancenion*, that is, "a place of tents:" it was changed, however, into Mancunium by the Romans, who conquered it under Agricola, in the memorable year of the Christian æra 79. It appears also to have been called Manduesuedum, Manduessedum, Manucium, and Mancestre; from which last it seems most evident that the present name has been derived. It is distant from London 182 miles, and from Edinburgh 214; standing near the conflux of the Irk and the Irwell, about three miles from the Mersey.

Manchester was accounted a large and populous town even 50 years ago; but since that time it is supposed to have increased in more than a triple proportion, both in respect to buildings and inhabitants. In 1800 the number of houses was 12,547, of inhabitants 84,020: since that period the inhabitants have augmented to more than 100,000. Such has been the happy concurrence of ingenuity and industry, and such the astonishing improvements daily making in its numerous manufactures, together with the encouragement these afford to skilful artists in various branches, that streets must extend in proportion: yet population appears to have increased more rapidly than buildings; hence competitions naturally arise, and hence a temporary advance of rents. The manufactures of this town and neighbourhood, from humble domestic beginnings about two centuries ago, have now, after progressive improvements, acquired such celebrity, both in the scale of ornament and utility, as to spread in ten thousand forms and colours, not only in these kingdoms, but over all Europe, and even into the distant continents; being at once most precious mines of well-earned private wealth, and important contributors to the necessary public treasure of the state. Its post-office alone may afford an evidence of its extensive commerce. The population of the town may be further calculated from the great number of cotton factories within the boundaries of the town, wherein it is thought that 30,000 men, women, and children, are employed in the mere branches of preparing warp and weft. If to these be added the many hands applied to weaving, &c. &c. &c. beside all the more general mechanics, as well as householders, domestic servants, &c. Manchester may be ranked (except Liverpool) as the most populous market-town in Great Britain.

The college here was founded in 1422, by Thomas West, lord Delaware; and consisted of a warden, eight fellows, four clerks, and six choristers. About the same time the present collegiate church was built (timber only having been used for the former church), and John Huntington bachelor of laws was the first warden, named by the founder himself: he enjoyed the wardenship nearly 40 years; and a monument justly remains to his memory, he having been the first to propose and assist in the erection of the church. He died Nov. 11, 1458, and was interred in the middle of the choir.—This church is a fine structure of what is termed the Gothic system, and is more enriched with sculpture than such churches usually are. The tabernacle work over the stalls in the choir is very curious, as are the large arches added upon vaulting the choir. The organ, which cost not less than 1000l. is large and powerful. The last warden was Richard Murray, D. D. the 14th in succession. The college was new-founded in 1636; and Richard Heyrick, B. D. named the first warden on that foundation.—The present warden, Richard Asheton, D. D. rector of Middleton, is the fifth in succession from Richard Heyrick. The collegiate body now consists of a warden, four fellows, two chaplains, two clerks (one of whom, by a late regulation, is to be at least bachelor of arts and in priest's orders), four choristers, and four singing men.

Beside the collegiate church, there are also the following: St. Anne's, a handsome church, begun in 1709 and finished in 1723: it is the gift of the bishop of Chester. St. Mary's, built by the clergy of the collegiate church, and consecrated upwards of 36 years ago, is a neat and indeed an elegant edifice; as is St. John's, which was built about 26 years since by the late Edward Byrom, Esq. The next presentation thereof is, by act of parliament, vested in his heirs, afterwards devolving to the warden and fellows of the collegiate church. St. Paul's church was erected upwards of 18 years ago; and is a handsome spacious building, chiefly brick; to which has been added, within the last eight years, a lofty and substantial stone tower. St. James's church has been erected about 16 years: it is a large well-lighted building of brick and stone, with a small stone steeple. St. Michael's is also of brick and stone, with a square tower. It was built by the late Rev. Humphrey Owen (one of the chaplains of the collegiate church, and rector of St. Mary's), in whose heirs the presentation is vested for a term of 60 years, and thencefor-

ward in the warden and fellows of the college. To these may be added, St. Thomas's, Ardwick Green; and Trinity church, Salford: for though the Irwell intervenes between Manchester and Salford, and each is governed by its respective constables; yet, being connected by three bridges, by mutual friendship, and by the common pursuit of universally useful manufactures and commerce, the two places are generally considered under the name of Manchester, as the borough of Southwark is not improperly deemed a part of the metropolis. In Salford there is likewise a methodist chapel, and a church dedicated to St. Stephen. In Manchester is a new church, finished six years ago, and called St. George's. St. Peter's church, at the end of Mosley-street, is a strong and elegant stone structure with a high spire: it is lighted, in a manner not very common, by six semicircular windows. Another church, called St. Clement's, was also begun in the year 1792, in Stephenson's square; and also one called the New Jerusalem church. Beside the fourteen churches above enumerated, there are, a catholic chapel, three large methodist chapels, a chapel for the people called quakers, and ten chapels for dissenters of other denominations.

Cheetham's Hospital, commonly called the College, because it was originally the place of residence of the warden and fellows, is deserving of particular notice. Humphrey Cheetham, of Clayton, near Manchester, Esq. having been remarkably successful in trade, in the middle of the last century bought the college, and liberally endowed it for the maintenance and education of 40 poor boys, admissible between the age of 6 and 10 years. By an improvement of the funds of the charity, the number of boys was increased to 60; and continued such till the Easter meeting of the feoffees in 1780, when another augmentation took place, and the number has since been constantly 80.—The townships, pointed out by the founder for objects of his charity, are the following, together with the respective numbers admitted from each: Manchester, original number 14, now 28; Salford 6, now 12; Droylsden 3, now 6; Crumpsall 2, now 4; Bolton-le-moors 10, now 20; Turton 5, now 10.—So that 89 persons are now annually provided for by this liberal benefactor; including for the hospital a governor, one man and five women servants; a school-master; and, on the library establishment, a librarian. (See an authentic letter in the Gent. Mag. for June 1792, p 521). The boys of this hospital are comfortably provided for till the age of 14, when they are further clothed, and with a premium placed apprentices to useful trades; and, in order to incite early habits of industry, to make them good servants, and at length good masters, it has been suggested to furnish some kind of easy employment for a small part of their time not engaged at school. The library, which occupies an extensive gallery of the same building, owes its foundation and increasing importance to the same benevolent source. The annual value of the fund originally bequeathed for the purchase of books and for a librarian's salary was 116l.; but by recent improvements of the estate, the income is more than thrice that sum. The books at this time amount to 10,000 volumes, of which a catalogue handsomely printed in two vols. 8vo. has been published by the present librarian, the Rev. John Radcliffe, A. M. At stated hours on all days, except Sundays and other holidays, the studious may have free access to read, in the library, any book it contains; and in order to render it comfortable during the cold season of the year, several stoves are kept heated at the reading hours. This college and a large inclosed area are situated upon a high perpendicular rock, bounded by the Irk close to its confluence with the Irwell; and is thought by Mr. Whitaker to be included, as well as the collegiate church, within the boundaries of the ancient Roman prætorium; the whole of which site towards the Irwell, as on the side of the Irk, is considerably elevated above the water and the opposite land of Salford. The Free-school, higher up on the same side the Irk, almost joining to the college, is supported by the rents of three mills; one of which is for grinding malt, another for corn, and the third is employed as a snuff-mill. These rents are now increased to 700l. per annum, from which salaries are paid to three masters and two assistants. The scholars educated here have certain exhibitions allowed at the university; and such of them as are entered at Brazen-nose college, Oxford, have a chance of obtaining some valuable exhibitions arising from lands in Manchester bequeathed by Mr. Hulme.—The deserved reputation of this school is a powerful recommendation of its scholars entering at the universities. The Academy is a large and commodious building, raised by the subscriptions of several respectable dissenters, and placed under the care of able tutors. Here youth above 14 years of age are admitted and instructed in the various branches of liberal knowledge, preparatory to trade or the professions. The Literary and Philosophical Society of Manchester was instituted in the beginning of the year 1781, and is well known by its memoirs, of which several volumes 8vo. have been published; these have been translated into the German language.

A society was also established here in November 1789, under the name of the Lancashire Humane Society, for the encouragement of all who may attempt the recovery of persons apparently drowned. The Infirmary, Dispensary, Lunatic Asylum, and public Baths, are all situated on one large airy plot of land, in the most elevated and agreeable part of the town; a pleasant grass-plot and gravel-walk extending the whole length of the buildings; a canal intervening between them and the public street, next to which it is guarded by iron palisades. The Lying-in Hospital is situated in Salford, at the end of the old bridge. A new Work-house is completed; and for such a purpose a happier spot could not be found in any town than that whereon it is erected, being on an equal eminence with the

college on the opposite side of the Irk, and promising the greatest possible comforts to such as may be necessitated to become its inhabitants. The Exchange was a strong good building; but since the late act of parliament obtained for farther improvements of the town, it has been sold and taken down, and its site formed into a convenient area, to the great advantage of the surrounding honses. The Theatre is a neat building, wherein the boxes are placed in a semicircle opposite to the stage. The gentlemen's Concert-room is an elegant building, capacious enough to accommodate 1200 persons. The concerts are supported by annual subscriptions: but strangers and military gentlemen have free admission to the private concerts; as also to the public concerts, with a subscriber's ticket. The new assembly-rooms are large and commodious. A Circus is likewise built. Here are two Market-places, the old and the new; which are well supplied with every thing in season, though at high rates. There are several charity-schools belonging to different churches and chapels, where children are furnished with clothes and taught to read. The Sunday-schools are numerous, and afford instruction to upwards of seven thousand children. The Exchange and the Portico are both very fine buildings.

Over the Irwell are three bridges, uniting the town with Salford: the old bridge is very high at the Manchester end, whence it slopes into Salford. The middle bridge, four feet wide, raised upon timber and flagged, is only for accommodation of foot passengers, who from the Manchester side must descend to it by nearly forty steps. The lower bridge is a handsome stone building of two arches; this bridge affords a level road for two or three carriages abreast. It was undertaken and finished by the private subscription of a few gentlemen: and a small toll is taken for all passing, which toll is now annually let by auction, and pays the proprietors remarkably well.—From Manchester there are likewise the same number of bridges over the Irk; only one, however, is adapted for the passage of carriages. The Irwell having at a great expence been rendered navigable for vessels of 20 or 30 tons burden, there is a constant communication between Liverpool, Manchester, and the intermediate places on the Irwell and Mersey, to the great advantage of the proprietors and the country at large. This navigation, and more especially the duke of Bridgewater's canal, opening a passage from Manchester to the Mersey at 30 miles distance, have, together, greatly contributed to the present highly flourishing state of the town. Advantages still greater, because more widely diffusive, may result from the intended union of the Humber and the Mersey by means of canals. Indeed, every mile of canal would benefit many miles of land; and such would be the reciprocity of interest, that it would undoubtedly extend and be felt far beyond the visible measurement of the navigation.

We must not omit to mention the new penitentiary house, called the New Bailey, for separate confinement of various criminals.—Over the entrance is a large session-room, with adjoining rooms for the magistrates, council, jurors, &c. Beyond this, in the centre of a very large area inclosed by very high walls, stands the Prison, an extensive building, forming a cross, three stories high; and the four wards of each story may in an instant be seen by any person in its centre. This prison is kept surprisingly neat and healthy; and such as can work at any trade, and are not confined for crimes of the greatest magnitude, are employed in a variety of branches; so that one may be seen beating and cleansing cotton, another carding it, another roving, and a fourth spinning. In the next place may be observed a man or a woman busy at the loom; and in another, one or more engaged in cutting and raising the velvet pile. Hence industry is not suffered to slumber in the solitary cell, nor to quit it under the acquired impressions of that torpor which formerly accompanied the emancipated prisoner from his dungeon; rendering him, perhaps, totally unfit for the duties of honest society, though well qualified, in all probability, to herd with gamblers, and be then, if not before, initiated into their pernicious mysteries.—At Kersal-moor, three miles distant, horse-races are annually permitted. The banks of the rivers and various brooks about the town afford excellent situations for the numerous dye-houses employed for a multitude of fabrics. Among other things, the manufacture and finishing of hats is carried on to an extent of great importance. The general market is here on Saturday. Tuesday's market is chiefly for transacting business between the traders and manufacturers of the town and circumjacent country. The fairs are on Whit-Monday, October 1st, and November 17th.

Manchester is a manor with courts leet and baron. It sends no members to parliament, but gives title to a duke.

Manchester, a town of Virginia, on James River, opposite to Richmond, with which it is connected by a bridge.

MA'NCHET. *s.* (*michet*, French. *Skinner*). A small loaf of fine bread (*More*)

MANCHINEEL TREE. See Hippomane.

To MA'NCIPATE. *v. a.* (*mancipo*, Latin.) To enslave; to bind; to tie (*Hale*).

MANCIPA'TION. *s.* (from *mancipate.*) Slavery; involuntary obligation.

MA'NCIPLE. *s.* (*manceps*, Lat) The steward of a community; the purveyor (*Betterton*).

MANCUNIUM, a town of the Brigantes in Britain, situated where Manchester now stands.

MANCUS, in antiquity, an Anglo-Saxon gold coin, worth about 30 pence.

MANDAMUS, in law, a writ issuing out of the court of king's-bench, sent by the king, and directed to any person, corporation, or inferior court of judicature, within the king's dominions; requiring them to do some particular thing therein specified, which pertains

to their office and duty, and which the court of king's bench has previously determined, or, at least, supposes to be consonant to right and justice. This is a high prerogative writ, of a most extensively remedial nature; and may be issued in some cases where the injured party has also a more tedious method of redress, as in the case of admission or restitution to an office: but it issues in all cases where the party hath a right to any thing done, and hath no other specific means of compelling its performance. A mandamus, therefore, lies to compel the admission or restoration of the party applying to any office or franchise of a public nature, whether spiritual or temporal; to academical degrees; to the use of a meeting-house, &c. It lies for the production, inspection, or delivery of public books and papers; for the surrender of the regalia of a corporation; to oblige bodies corporate to affix their common seal; to compel the holding of a court, &c.

MANDARINS, a name given to the magistrates and governors of provinces in China, who are chosen out of the most learned men, and whose government is always at a great distance from the place of their birth. Mandârin is also a name given by the Chinese to the learned language of the country.

MA'NDATARY. *s.* (*mandataire*, French.) He to whom the pope has, by virtue of his prerogative, and his own proper right, given a mandate for his benefice (*Ayliffe*).

MA'NDATE. *s.* (*mandatum*, Latin.) 1. Command (*Howel*). 2. Precept; charge; commission, sent or transmitted (*Dryden*).

MANDA'TOR. *s.* (Latin.) Director (*Ayliffe*).

MA'NDATORY. *a.* (*mandare*, Latin.) Preceptive; directory.

MANDIBULA'. MANDIBLE. (*mandibula*, from *mando* to chew.) In anatomy usually applied to the lower jaw: in natural history, to both jaws. See MAXILLA INFERIOR.

MANDI'BULAR. *a.* (from *mandibula*, Lat.) Belonging to the jaw.

MANDILION. *s.* A soldier's coat.

MANDINGO, a kingdom of Africa, situated about 200 miles from the Atlantic, near the river Gambia. The Mandingoes are in general a lively, joyous people, who consume half their time in dancing, music, mirth, and good-humoured gaiety; yet being much addicted to company, warm and impetuous in their disposition, they fall into frequent quarrels, which commonly terminate in blood. Necessity and self-preservation oblige them to sow and reap, but this labour does not last above two months in a year; the other months are spent in idleness and sloth all the day, and at night in dancing under the shade. A few childish diversions they have, which they perform with abundance of address; but every thing manly is neglected: fishing and hunting are unknown, though no country affords better opportunities for both. Smoking tobacco is their whole pleasure, which increases their natural sloth, by destroying their appetite for food. It is of the growth of their country, and they smoke in wooden pipes, five or six feet in length, the bowl made of wood, hardened and dried in the fire, and finely polished. Immediately after a child is born he is bathed in cold water three or four times a day, and after being carefully dried, anointed with palm-oil along the spine, elbows, hams, and neck. They go naked to the age of eight or ten, and frequently paint their faces and neck for ornament. Every part of domestic economy is left to the care of the women, while the men cultivate the small quantities of rice wanted for the family, and pass away the rest of their time in idleness.—After laying up a quantity sufficient for the consumption of the family, the women have a right to dispose of the rest, but are accountable for the profits that arise to their husbands.—Many of the Mandingoes have a pride in keeping a crowd of slaves, whom they treat with such gentle usage, kindness, and humanity, that it is not easy to distinguish the master from the slave; especially the women, who wear necklaces, bracelets, and ear-rings, of amber, coral, and silver, as if the men had purchased them only to become their husbands. Most of these slaves are born in their families, and naturalized to them as their own children. In most other parts of Africa the master has a right to sell all slaves born in the family; but in Mandingo this action is treated as a crime, insomuch, that if any of them are disposed of without their consent, and against the will of their fellow-slaves, they all abandon their master, and seek a retreat in some other kingdom: for, though in this case he has no power to punish them, yet they reckon it dishonourable to enter into the service of another master in the same kingdom. Its principal town is Kamalia, situated in lat. 12. 40 N. lon. 6. 40 W.

MANDRAGORA. (*mandragora*, μανδραγορας, from μανδρα, a den, and αγειρω, to collect, because it grows about caves and dens of beasts; or from the German *man dragen*, bearing man). Mandrake. *Atropa mandragora* of Linnéus. The boiled root is employed in the form of poultice to discuss indolent tumours. See ATROPA.

MANDRAKE. See MANDRAGORA and ATROPA.

MANDREL, a kind of wooden pulley, making a member of the turner's lathe. Of these there are several kinds; as flat mandrels, which have three or more little pegs or points near the verge, and are used for turning flat boards on. Pin mandrels, which have a long wooden shank to fit into a round hole made in the work to be turned. Hollow mandrels, which are hollow of themselves, and used for turning screws, &c.

To MA'NDUCATE. *v. a.* (*manduco*, Lat.) To chew; to eat.

MANDUCA'TION. *s.* (*manducatio*, Lat.) Eating (*Taylor*).

MANE. *s.* (*maene*, Dutch.) The hair which hangs down on the neck of horses, or other animals (*Sidney*).

MA'NEATER. *s.* (*man* and *eat.*) A cannibal; an anthropophagite.

MA'NED. *a.* (from *mane.*) Having a mane.

MANEGE. See MANAGE.

MANES, a son of Jupiter and Tellus, who reigned in Mæonia. He was father of Cotys by Calirrhoe, the daughter of Oceanus.

MANES, a name generally applied by the ancients to the souls when separated from the body. They were reckoned among the infernal deities, and generally supposed to preside over the monuments of the dead. They were worshipped with great solemnity, particularly by the Romans. Virgil introduces his hero as sacrificing to the infernal deities, and to the manes, a victim, whose blood was received in a ditch.

MANETHA, in botany, a genus of the class tetrandria, order monogynia. Calyx eight-leaved, superior; corol four-cleft; capsule inferior, two-valved, one-celled; seeds imbricate, orbicular, with a central seedlet. Five species: four natives of the West Indies and South America; one of Egypt: all shrubs, and generally with axillary peduncles and white flowers.

MANETHO, an ancient Egyptian historian, who pretended to take all his accounts from the sacred inscriptions on the pillars of Hermes Trismegistus. He was high-priest of Heliopolis in the time of Ptolemy Philadelphus, at whose request he wrote his history in Greek; beginning from their gods, and continuing it down to near the time of Darius Codomannus, who was conquered by Alexander the Great. His history of Egypt is a celebrated work, that is often quoted by Josephus and other ancient authors. Julius Africanus gave an abridgment of it in his Chronology. Manetho's work is however lost; and there only remain some fragments extracted from Julius Africanus, which are to be found in Eusebius's Chronica.

MANFREDI (Eustachio), a celebrated astronomer and mathematician, born at Bologna in 1674. His genius was always above his age. He was a tolerable poet, and wrote ingenious verses while he was but a child. And while very young he formed in his father's house an academy of youth of his own age, who became the Academy of Sciences, or the Institute, there. He became professor of mathematics at Bologna in 1698, and superintendant of the waters there in 1704. The same year he was placed at the head of the college of Montalte, founded at Bologna for young men intended for the church. In 1711 he obtained the office of astronomer to the Institute of Bologna. He became member of the Academy of Sciences of Paris in 1726, and of the Royal Society of London in 1729; and died the 15th of February, 1739.—His works are: 1. Ephemerides Motuum Cœlestium ab anno 1715 ad annum 1750; four volumes in quarto. The first volume is an excellent introduction to astronomy; and the other three contain numerous calculations. His two sisters were greatly assisting to him in composing this work. 2. De Transitu Mercurii per Solem, anno 1723. Bologna 1724, in quarto. 3. De Annuis Inerrantium Stellarum Aberrationibus, Bologna 1729, in quarto. Besides a number of papers in the Memoirs of the Academy of Sciences, and in other places. (*Hutton's Dictionary.*)

MA'NFUL. *a.* (*man* and *full.*) Bold; stout; daring (*Hudibras*).

MA'NFULLY. *ad.* Boldly; stoutly (*Ray*).

MA'NFULNESS. *s.* (from *manful.*) Stoutness; boldness.

MANGALORE, a seaport of Canara, on the coast of Malabar, with an excellent road for ships. It is inhabited by Gentoos and Mahometans. The former, on their festival days, carry their idols in triumph, placed in a waggon, adorned on all sides with flowers; and on the wheels are several sharp crooked iron hooks, upon which the mad devotees throw themselves, and are crushed to pieces. It is a place of great trade, and the Portuguese have a factory here for rice, and a large church frequented by black converts. The adjoining fields bear two crops of corn in a year; and the higher produce pepper, betel-nuts, sandal wood, iron, and steel. It is seated on a rising ground, 100 miles N. by W. of Tellicherry. Lon. 75. 24 E. Lat. 13. 8 N.

MANGANESE, in mineralogy. See MAGNESIATA.

MANGE: the itch of horses, dogs, and other quadrupeds, produced by a species of the acarus or itch insect burrowing under the cuticle; and hence, like the human itch, contagious. Meagre living, and, above all, uncleanliness, predisposes to this disease among quadrupeds as among mankind. It is destroyed by the same kinds of application, as hellebore, sulphur, and different preparations of quicksilver.

MANGEEA, an island in the S. Pacific Ocean, five leagues in circumference. In the interior parts it rises into small hills, and captain Cook represents it as a fine island; but the hostile appearance of its inhabitants obliged him to leave it soon. Lon. 158. 16 W. Lat. 21. 27 S.

MANGEL-WURZEL. See BETA.

MA'NGER. *s.* (*mangeoire*, French) The place or vessel in which animals are fed with corn (*L'Estrange*).

MA'NGINESS. *s.* (from *mangy.*) Scabbiness; infection with the mange.

MANGET (John James), an eminent physician, born at Geneva in 1652. The elector of Brandenburg made him his first physician in 1699; in which post he continued till his death, which happened at Geneva in 1742. He wrote many works; the most known of which are, 1. A collection of several Pharmacopœias, in folio. 2. Bibliotheca pharmaceutico-medica. 3. Bibliotheca anatomica. 4. Bibliotheca chemica. 5. Bibliotheca chirurgica. 6. A bibliotheca of all the authors who have written on medicine, in 4 vols. folio. All these works are in Latin. Daniel le Clerc, the author of a history of physic, assisted him in writing them.

MANGIFERA. Mango-tree. In botany, a genus of the class pentandria, order mono-

gynia. Corol five-petalled; drupe kidney-form. Three species: trees of India and the Mauritius. The chief is the indica, with oblong-lanceolate leaves; flowers with about one stamen; drupe very large, kidney-form. The plant has never thriven in our own gardens. The drupe when ripe is highly esteemed in India; but in this country we know but little of it from its never succeeding as a seed, excepting in an unripe state, in which we receive it largely in the form of a pickle.

To MA'NGLE. *v. a.* (*mangelen*, Dutch; *maneus*, Latin.) To lacerate; to cut or tear piecemeal; to butcher (*Milton*). 2. To smoothen linen after it has been washed.

MANGLE, a valuable domestic machine, employed for the purpose of smoothing such linen as cannot be conveniently ironed.

Various patents have been granted for improvements in this machinery: of these we shall describe two. Mr. Stephen Clubbs' (patent dated September, 1805), is constituted chiefly of two hollow rollers, which may be conveniently about 2½ feet long and 14 inches diameter. They are not complete cylinders, but have about a fourth of the curve surface of each cut off by a plane running parallel to the axis of the cylinder. These hollow rollers being fixed in a stout frame, with their axles parallel to each other, and at about 14 inches distance, if they be turned round until the flat parts of each are brought near together, they will leave a space of about three inches to receive a small roller of that diameter, on which the linen is to be wound. The flat part of the upper roller is made to open so as to receive the materials which are put in to make it sufficiently heavy. A toothed wheel is fixed at one end of the upper roller, about two inches larger in diameter than the roller itself; and an equal toothed wheel is fixed at the opposite end of the lower roller. A horizontal axle carrying two pinions is so fixed that these pinions work into the teeth of both wheels; so that motion may be given to the whole by a winch at one extremity of this latter axle. The gudgeons at both ends of the upper roller, and at both ends of the axle carrying the pinions, should be joined by the connecting rods, and the whole have room to rise and fall three or four inches when occasion requires. The small roller is fixed in the frame by a button, which turns over the centre or spindle of it; and on the other side of the frame, the end of the cloth which goes round the linen winds up and down when the mangle is at work.

The patentee states three advantages as peculiar to his mangle, the first of which is founded upon an erroneous notion in theory, and is therefore omitted; the two latter of these we are inclined to allow, and therefore state them below.

"As the weight is constantly upon the linen, from the time it is introduced into the mangle until delivered out, the mangling must certainly be executed faster than if the linen were to be worked off of one roller upon another, as in the mangles of the usual construction.

"The weight used in my mangle is little more than half the weight required in any other mangle, consequently a little more than half the labour or power employed in other mangles will be necessary to set mine to work."

In Mr. J. Morris's patent mangle, two horizontal parallel cylindrical rollers form a bed for the roller on which the linen to be mangled is rolled; one of them *b* is seen in fig. 14. pl. 99. the axes of those rollers bear on brass, let into the wood frame, and have a wheel fixed to each, which works in a pinion on the axis of the fly wheel, as seen in the drawing, *c*, a moveable roller on which the linen to be mangled is rolled. *d*, A roller, the axis of which works in pieces of brass which slide between iron, let into the inner side of the wood frame, to the bottom of which long pieces of iron, *f*, are fixed with hooks at their lower extremities, to which are attached the chains that support the scale or platform, *h*, where iron weights or any other heavy substance are placed: to the top of the brass in which the roller *d* works, the engine chains are fastened, which pass through apertures at each end of the top of the wood frame, and are there again fastened on the pulleys of the shaft *k* with a screw. *l* is a leaver fixed to the end of the shaft *k*.

To use the machine, press the leaver *l* and fasten it with the hook, which raises the roller *d* with the platform and weights attached to it; then take out the roller *c*, and roll the linen and mangling cloth round it, and replace it on the two bottom rollers, unhook the leaver *l* and the weights on the platform will press the roller *d* on the roller *c*; give motion to the fly wheel, and also to all the rollers, by turning the handle *m*, which in a short time will make the linen beautifully smooth; press down the leaver, fasten it with the hook, and take the roller *c* out: a spare roller is supplied; so that if two persons are employed, one may be filling it with linen, while the other is mangling.

MA'NGLER. *s.* (from *mangle.*) A hacker; one that destroys bunglingly; one that smooths linen with a mangle.

MANGO. The fruit of the mangifera indica of Linnéus, which is cultivated all over Asia. When ripe it is juicy, of a good flavour, and so fragrant as to perfume the air to a considerable distance. It is eaten rather raw, or preserved with sugar. Its taste is so luscious, that it soon palls the appetite. The unripe fruits are pickled in the milk of the cocoa nut that has stood until sour, with salt, capsicum, and garlic. See MANGIFERA.

MANGO FISH. See POLYNEMUS.

MANGOSTAN. MANGOSTEEN. A fruit about the size of an orange, which grows in great abundance on the tree called garcinia mangostana by Linnéus, in Java and the Molucca islands. According to the concurring testimonies of all travellers, it is the most exquisitely flavoured and the most salubrious of all fruits, it being such a delicious mixture of the tart and sweet The flesh is juicy, white, almost transparent, and of a more delicate and agreeable flavour than the richest grape. It is

eaten in almost every disorder, and the dried bark is used medicinally in dysenteries and tenesmus, and a strong decoction of it is much esteemed as a gargle in ulcerated sore throats. See GARCINIA.

MANGOSTEEN BARK. See MANGOSTEEN.

MANGROVE TREE. See RHIZOPHORA.

MA'NGY. *a.* (from *mange.*) Infected with the mange; scabby (*Shakspeare*).

MANHA'TER. *s.* (*man* and *hater.*) Misanthrope; one that hates mankind.

MANHEIM, a town of Germany, in the Lower Palatinate, with a very strong citadel, and a palace, where the elector palatine often resides. It is seated at the confluence of the rivers Neckar and Rhine, in lon. 8. 33 E. lat. 49. 25 N.

MA'NHOOD. *s.* (from *man.*) 1. Human nature (*Milton*). 2. Virility; not womanhood (*Dryden*). 3. Virility; not childhood (*Pope*). 4. Courage; bravery; resolution; fortitude.

MANIA. (*mania*, μανια, from μαινομαι, to rage.) Raving or furious madness. A genus of disease in the class neuroses and order vesaniæ of Cullen, characterized by a conception of false relations, and an erroneous judgment, arising from imaginary perceptions or recollections, exciting the passions, and producing unreasonable actions or emotions, with a hurry of mind in pursuing a train of thought, and in running from one train of thought to another; attended with incoherent and absurd speech, called raving, and violent impatience of either contradiction or restraint.

MANI'AC. MANI'ACAL. *a.* (*maniacus*, Lat.) Raging with madness (*Grew*).

MANICHEES, or MANICHEANS, MANICHÆI, a sect of ancient heretics, who asserted two principles; so called from their author Manes, or Manichæus, a Persian by nation, and educated among the Magi, being himself one of that number before he embraced christianity.

This heresy had its first rise about the year 277, and spread itself principally in Arabia, Egypt, and Africa. St. Epiphanius, who treats of it at large, observes, that the true name of this heresiarch was Cubricus; and that he changed it for Manes; which in the Persian or Babylonish language signifies vessel. A rich widow, whose servant he had been, dying without issue, left him store of wealth; after which he assumed the title of the apostle or envoy of Jesus Christ.

Manes was not contented with the quality of apostle of Jesus Christ, but he also assumed that of the paraclete, whom Christ had promised to send: which Augustin explains by saying, that Manes endeavoured to persuade men that the Holy Ghost did personally dwell in him with full authority. He left several disciples, and, among others, Addas, Thomas, and Hermas. These he sent, in his life-time, into several provinces to preach his doctrine.—Manes, having undertaken to cure the king of Persia's son, and not succeeding, was put in prison upon the young prince's death; whence he made his escape; but he was apprehended soon after, and flayed alive.

The doctrine of Manes was a motley mixture of the tenets of Christianity with the ancient philosophy of the Persians, in which he had been instructed during his youth. He combined these two systems, and applied and accommodated to Jesus Christ the characters and actions which the Persians attributed to the god Mithras.

He established two principles, viz. a good and an evil one: the first, a most pure and subtile matter, which he called light, did nothing but good; and the second, a gross and corrupt substance, which he called darkness, nothing but evil. This philosophy is very ancient; and Plutarch treats of it at large in his Isis and Osiris.

Our souls, according to Manes, were made by the good principle, and our bodies by the evil one; those two principles being, according to him, coeternal, and independent of each other. Each of these is subject to the dominion of a superintending being, whose existence is from all eternity. The being who presides over the light is called God; he that rules the land of darkness bears the title of hyle or demon. The ruler of the light is supremely happy, and in consequence thereof benevolent and good: the prince of darkness is unhappy in himself, and desirous of rendering others partakers of his misery, and is evil and malignant. These two beings have produced an immense multitude of creatures, resembling themselves, and distributed them through their respective provinces. After a contest between the ruler of light and the prince of darkness, in which the latter was defeated, this prince of darkness produced the first parents of the human race. The beings engendered from this original stock consist of a body formed out of the corrupt matter of the kingdom of darkness, and of two souls, one of which is sensitive and lustful, and owes it existence to the evil principle; the other rational and immortal, a particle of that divine light, which had been carried away in the contest by the army of darkness, and immersed into the mass of malignant matter. The earth was created by God, out of this corrupt mass of matter, in order to be a dwelling for the human race, that their captive souls might, by degrees, be delivered from their corporeal prisons, and the celestial elements extended from the gross substance in which they were involved. With this view God produced two beings from his own substance, viz. Christ and the Holy Ghost: for the Manicheans held a consubstantial Trinity. Christ, or the glorious intelligence, called by the Persians Mithras, subsisting in and by himself, and residing in the sun, appeared in due time among the Jews, clothed with the shadowy form of a human body, to disengage the rational soul from the corrupt body, and to conquer the violence of malignant matter. The Jews, incited by the prince of darkness, put him to an ignominious death, which he suffered not in reality, but only in appearance, and according to the opinion of

men. When the purposes of Christ were accomplished he returned to his throne in the sun, appointing apostles to propagate his religion, and leaving his followers the promise of the paraclete or comforter, who is Manes, the Persian. Those souls who believe Jesus Christ to be the son of God, renounce the worship of the god of the Jews, who is the prince of darkness, and obey the laws delivered by Christ, and illustrated by Manes, the comforter, are gradually purified from the contagion of matter; and their purification being completed, after having passed through two states of trial, by water and fire, first in the moon, and then in the sun, their bodies return to their original mass; for the Manicheans derided the resurrection of bodies; and their souls ascend to the regions of light. But the souls of those who have neglected the salutary work of purification pass, after death, into the bodies of other animals, or natures, where they remain till they have accomplished their probation. Some, however, more perverse and obstinate, are consigned to a severer course of trial, being delivered over, for a time, to the power of malignant aerial spirits, who torment them in various ways. After this a fire shall break forth and consume the frame of the world: and the prince and powers of darkness shall return to their primitive seats of anguish and misery, in which they shall dwell for ever. These mansions shall be surrounded by an invincible guard, to prevent their ever renewing a war in the regions of light.

Though the Manichees professed to receive the books of the New Testament, yet, in effect, they only took so much of them as suited with their own opinions. They first formed to themselves a certain idea or scheme of Christianity; and to this adjusted the writings of the apostles; pretending that whatever was inconsistent with this had been foisted into the New Testament by later writers, who were half Jews. On the other hand, they made fables and apocryphal books pass for apostolical writings; and even are suspected to have forged several others, the better to maintain their errors.

Towards the middle of the twelfth century the sect of Manichees took a new face, on occasion of one Constantine, an Armenian, and an adherer to it; who took upon him to suppress the reading of all other books besides the Evangelists, and the Epistles of St Paul, which he explained in such manner, as to make them contain a new system of Manicheism. He entirely discarded all the writings of his predecessors; rejecting the chimeras of the Valentinians, and their thirty æons; the fable of Manes, with regard to the origin of rain, and other dreams; but still retained the impurities of Basilides. In this manner he reformed Manicheism, insomuch that his followers made no scruple of anathematizing Scythian, Buddas, called also Addas, and Terebinth, the contemporaries and disciples, as some say, and, according to others, the predecessors and masters of Manes, and even Manes himself, Constantine being now their great apostle. After he had seduced an infinite number of people, he was at last stoned by order of the emperor.

This sect prevailed in Bosnia and the adjacent provinces about the close of the fifteenth century; propagated their doctrines with confidence, and held their religious assemblies with impunity. See on the subject of this article, Mosheim's Eccl. Hist. vol. i. p. 239, &c. 8vo. edit. Lardner's Cred. of the Gospel Hist. vol. viii. passim.

MANICORDON, or MANICHORD, a musical instrument in form of a spinet; the strings of which, like those of the clarichord, are covered with little pieces of cloth, to deaden as well as to soften their sound, whence it is also called the dumb spinet.

MA'NIFEST. *a.* (*manifestus*, Latin.) 1. Plain; open; not concealed (*Romans*). 2. Detected (*Dryden*).

MA'NIFEST. *s.* (*manifeste*, French.) Declaration; public protestation (*Dryden*).

To MANIFE'ST. *v. a.* (*manifester*, French; *manifesto*, Latin.) To make appear; to make public; to shew plainly; to discover (*Hammond*).

MANIFESTA'TION. *s.* (from *manifest.*) Discovery; publication; clear evidence (*Tillotson*).

MANIFE'STIBLE. *a.* (properly *manifestable*.) Easy to be made evident (*Brown*).

MA'NIFESTLY. *ad.* (from *manifest.*) Clearly; evidently; plainly (*Swift*).

MA'NIFESTNESS. *s.* (from *manifest.*) Perspicuity; clear evidence.

MANIFESTO, a public declaration made by a prince in writing, shewing his intentions to begin a war or other enterprise, with the motives that induce him to it, and the reasons on which he founds his rights and pretensions.

MA'NIFOLD. *a.* (*many* and *fold.*) Of different kinds; many in number; multiplied; complicated (*Shakspeare*).

MANIFO'LDED. *a.* (*many* and *fold.*) Having many complications (*Spenser*).

MA'NIFOLDLY. *ad.* (from *manifold.*) In a manifold manner (*Sidney*).

MANI'GLIONS. *s.* (In gunnery.) Two handles on the back of a piece of ordnance.

MANIHOT, in botany. See JATROPHA.

MANIKIN. *s.* (*mannikin*, Dutch.) A little man (*Shakspeare*).

MANILA, or MANILLA, a town of the island of Lucon, of which it is the capital, as well as of the Philippine Islands; situated on a bay on the south-west coast. In compass it is two miles, in length two thirds of a mile; the shape irregular, being narrow at both ends, and wide in the middle, and well furnished with brass guns, and good out-works. The palaces of Manilla, though all of timber above the first floor, yet are beautiful from their handsome galleries. The streets are broad, but frequent earthquakes have spoiled their uniformity, by overthrowing houses and palaces, which are not rebuilt. Manilla contains about 3000 souls, of various mixtures, qualities, and complexions, produced by the conjunction of Spaniards, Indians, Chinese, Malabars, Blacks,

and others inhabiting that city, and the adjacent islands. Though Manilla be so small, if we look only on the circumference of its walls, and the number of its inhabitants, yet it will appear large if we include its suburbs; for within a musket-shot of the gate of Parian is the habitation of the Chinese merchants, called Sangleys, who in several streets have rich shops of silk, porcelain, and other commodities. Here are found such as exercise all arts and trades; so that all the wealth of the citizens runs through their hands, through the indolence of the Spaniards and Indians, who apply themselves to nothing. There are about 3000 of them in this suburb, and as many more throughout the islands. There were formerly forty thousand; but abundance of them were put to death in tumults they raised at several times, particularly that on St. Francis's eve, in 1603, after which they were prohibited staying in the island by his Catholic majesty. The Spaniards oppress the Chinese very much, not suffering them to be in christian houses at night, and obliging them to be without light in their houses and shops. Over the bridge adjoining to Parian are suburbs or hamlets, fifteen in all, inhabited by Japanese, Tagalis, and other nations, under the government of an alcaide. The houses are generally of wood, near the river, and standing on pillars, with steps going up to them. The roofs are covered with nipa, or palm-tree leaves, the sides of cane, and they ascend to them by ladders, because the ground is moist, and sometimes full of water. The castle or fort stands at the west end of the city, having the sea on one side, and the river on the other: it is styled the citadel of St. James, and was originally fortified in the shape of a triangle, having one bastion towards the sea, another towards the river, and a third at the west point, to cover the port, which is only fit for small vessels. In the year 1645 great part of this city was destroyed by an earthquake, and 3000 people perished in the ruins. In the year 1762 Manilla was taken by the English, and to save it from destruction it was agreed to pay a million sterling for its ransom. Lon. 120. 54 E. Lat. 14 36 N.

MANILLA ISLANDS. See LUÇON and PHILIPPINE ISLANDS.

MANILIUS (Marcus), a Latin astronomical poet, who lived in the reign of Augustus Cæsar. He wrote an ingenious poem concerning the stars and the sphere, called Astronomicon; which, not being mentioned by any of the ancient poets, was unknown till about two centuries since, when it was found buried in some German library, and published by Poggius. There is no account to be found of this author but what can be drawn from his poem; which contains a system of the ancient astronomy and astrology, together with the philosophy of the Stoics. It consists of five books; though there was a sixth, which has not been recovered. In this work Manilius hints at some opinions, which later ages have been ready to glory in as their own discoveries. Thus, he defends the fluidity of the heavens, against the hypothesis of Aristotle: he asserts that the fixed stars are not all in the same concave superficies of the heavens, and equally distant from the centre of the world: he maintains that they are all of the same nature and substance with the sun, and that each of them has a particular vortex of its own: and lastly, he says, that the milky way is only the united lustre of a great many small imperceptible stars; which indeed the moderns now see to be such through their telescopes.

The best editions of Manilius are, that of Joseph Scaliger, in 4to. 1600; that of Bentley, in 4to. 1738; and that of Edmund Burton, esq. in 8vo. 1783.

MANILLE, in commerce, a large brass ring in the form of a bracelet, either plain or engraven, flat or round. Manilles are the principal commodities which the Europeans carry to the coast of Africa, and exchange with the natives for slaves. These people wear them as ornaments on the small of the leg, and on the thick part of the arm above the elbow. The great men wear manilles of gold and silver; but these are made in the country by the natives themselves.

MA'NIPLE. *s.* (*manipulus*, Latin.) 1. A handful. 2 A small band of soldiers.

MANI'PULAR. *a.* (from *manipulus*, Lat.) Relating to a maniple.

MANIPULUS is also an ecclesiastical ornament, worn by the priests, deacons, and subdeacons in the Romish church. It consists of a little fillet in form of a stole, three or four inches broad, and made of the same stuff with the chasuble; signifying and representing an handkerchief which the priests in the primitive church wore on the arm to wipe off the tears they were continually shedding for the sins of the people. There still remains a mark of this usage in a prayer rehearsed by those who wear it: Merear, Domine, portare manipulum fletus et doloris.—The Greeks and Maronites wear two manipules, one on each arm.

MANIPULUS, among physicians, is used to signify a handful of herbs or leaves, or so much as a man can grasp in his hand at once; which quantity is frequently denoted by the abbreviature, M or m.

MANIS, pangolin, in zoology, a genus of the class mammalia, order bruta. Toothless; tongue round, extensile; mouth narrowed into a snout; body covered above with moveable bony scales. Two species, as follow:

1. M. pentadactyla. Short-tailed manis. Feet five-toed; scales channelled at the base; imbricate, rounded, sharp at the edges; ears rounded, naked; under parts naked; tail flat, covered wholly with scales; length from six to eight feet including the tail. Inhabits Guinea, China, and India; when irritated, erects its scales; when attacked rolls up; except in the covering very much resembles the ant-eaters: feeds on ants and other insects, which it takes by laying its long tongue, covered with a glutinous saliva, across their path. from the strength of its scales it is able, when rolled up, to resist the force of the attack of the leopard,

whose powerful claws are incapable of making any impression upon it: by twisting these scales round the trunk of the elephant it is said to be able to destroy this bulky animal.

2. M. tetradactyla. Long-tailed manis. Has a slender nose: both its nose and head smooth: its body, legs, and tail, guarded by long sharp-pointed striated scales: its throat and belly covered with hair: its legs short, with four claws on each foot, one of which is very small; its tail tapers, but ends blunt. Guinea is supposed to be its native country. These animals approach so near the genus of lizards, as to be accounted the link in the chain of beings which connects the proper quadrupeds with the reptile class. They grow to a great length. One preserved in the museum of the Royal Society, London, measured from the nose to the tail only fourteen inches; while the tail itself was a yard and half a quarter.

MANI'SURIS. In botany, a genus of the class polygamia; order monœcia. Hermaph. Calyx, glume two-valved, one-flowered, outer valve emarginate at the top and sides; corol less than the calyx; stamens three; styles eleven. Male: female in the lower side of same spike, standing more erect. Two species; one a native of the East, the other of the West Indies.

MANKI'LLER. *s.* (*man* and *killer*.) Murderer (*Dryden*).

MANKI'ND. *s.* (*man* and *kind*.) The race or species of human beings (*Raleigh*).

MA'NKIND. *a.* Resembling man, not woman, in form or nature (*Shakspeare*).

MA'NLESS. *a.* (*man* and *less*.) Without men; not manned (*Bacon*).

MA'NLIKE. *a.* (*man* and *like*.) Having the proper qualities of man (*Sidney*).

MA'NLINESS. *s.* (from *manly*.) Dignity; bravery; stoutness (*Locke*).

MANLIUS, a name common to many illustrious Romans, the most celebrated of whom are the following.—1. Manlius, surnamed Torquatus, a celebrated Roman, whose youth was distinguished by a lively and cheerful disposition. These promising talents were, however, impeded by a difficulty of speaking. In a war against the Gauls, he accepted the challenge of one of the enemy, whose gigantic stature and ponderous arms had rendered him terrible and almost invincible in the eyes of the Romans. The Gaul was conquered, and Manlius stripped him of his arms, and from the collar (*torquis*) which he took from the enemy's neck he was ever after surnamed Torquatus. Manlius was the first Roman who was raised to the dictatorship, without having been previously consul. The severity of Torquatus to his son has been deservedly censured. He put to death his son, because he had engaged the enemy, and obtained an honourable victory, without his permission. This uncommon rigour displeased many of the Romans, and from it all edicts and actions of severity have been called Manliana edicta.—2. Marcus, a celebrated Roman, whose valour was displayed in the field, even at the age of 16. When Rome was taken by the Gauls, Manlius fled into the capitol, which he defended when suddenly surprised in the night by the enemy. The action gained him the surname of Capitolinus. A law which Manlius proposed to abolish the taxes on the common people raised the senators against him. The dictator Corn. Cossus seized him as a rebel, but the people put on mourning, and delivered from prison their common father. This did not in the least check his ambition; he continued to raise factions, and even secretly to attempt to make himself absolute, till at last the tribunes of the people themselves became his accusers. He was tried in the Campus Martius, but when the distant view of the capitol which Manlius had saved seemed to influence the people in his favour, the court of justice was removed, and Manlius was condemned. He was afterwards, for raising factions in the state, thrown down from the Tarpeian rock, A. U. C. 371, and to render his ignominy still greater, none of his family were afterwards permitted to bear the surname of Marcus.—3. A Roman appointed judge between his son Silanus and the province of Macedonia. When all the parties had been heard, the father said, "It is evident that my son has suffered himself to be bribed; therefore I deem him unworthy of the republic and of my house, and I order him to depart from my presence." Silanus was so struck at the rigour of his father that he hanged himself.

MA'NLY. *a.* (from *man*.) 1. Manlike; becoming a man; firm; brave; stout, undaunted; undismayed (*Dryden*). 2. Not womanish; not childish (*Shakspeare*).

MA'NLY. *ad.* With courage like a man.

MANNA. (*manna*, μαννα, from *mana*, a gift, Syr. it being the food given by God to the children of Israel in the wilderness; or from *mahna*, what is it? an exclamation occasioned by their wonder at its appearance). The condensed juice of the flowering ash, or fraxinus ornus, foliis ovato-oblongis serratis petiolatis, floribus corollatis. Hort. Kew. Class polygamia; order diœcia; which is a native of the southern parts of Europe, particularly Sicily and Calabria. Many other trees and shrubs have likewise been observed to emit a sweet juice, which concretes upon exposure to the air, and may be considered of the manna kind, especially the fraxinus rotundifolia and excelsior, and the hedysarum altragi, a plant indigenous to Persia. (See HEDYSARUM.) In Sicily these three species of fraxinus are regularly cultivated for the purpose of procuring manna, and with this view are planted on the declivity of a hill with an eastern aspect. After ten years growth the trees first begin to yield the manna, but they require to be much older before they afford it in any considerable quantity. Although the manna exudes spontaneously upon the trees, yet in order to obtain it more copiously, incisions are made through the bark by means of a sharp crooked instrument; and the season thought to be most favourable for instituting this process is a little before dog-days commence, when the weather is dry and serene. Manna

is generally distinguished into different kinds, viz. the manna in tear, the canulated and flaky manna, and the common brown or fat manna. All these varieties seem rather to depend upon their respective purity, and the circumstance in which they are obtained from the plant, than upon any essential difference of the drug. The best manna is in oblong pieces, or flakes, moderately dry, friable, very light, of a whitish or pale yellow colour, and in some degree transparent: the inferior kinds are moist, unctuous, and brown. Manna is well known as a gentle purgative, so mild in its operation that it may be given with safety to children and pregnant women,

MA'NNER. s. (*maniere*, French.) 1. Form; method (*Dryden*). 2 Custom; habit; fashion (*New Testament*). 3. Certain degree (*Bacon*). 4. Sort; kind (*Atterbury*) 5. Mien; cast of the look (*Clarissa*). 6. Peculiar way; distinct mode of person (*Clarendon*). 7. Way; mode (*Atterbury*). 8. (In the plural.) Character of mind (*Addison*). 9. General way of life; morals; habits (*Bacon*). 10. Ceremonious behaviour; studied civility (*Dryden*).

MA'NNERLINESS. s. (from *mannerly*.) Civility; ceremonious complaisance (*Hale*).

MA'NNERLY. a. (from *manner*.) Civil; ceremonious; complaisant (*Rogers*).

Ma'nnerly. *ad.* Civilly; without rudeness (*Shakspeare*).

MANNERS, the plural noun, has various significations; as, the general way of life, the morals, or the habits, of any person or people, also ceremonious behaviour, or studied civility. See the next article.

Manners (Good), according to Swift, is the art of making those people easy with whom we converse.

Whoever makes the fewest persons uneasy, is the best bred in the company.

As the best law is founded upon reason, so are the best manners. And as some lawyers have introduced unreasonable things into common law, so likewise many teachers have introduced absurd things into common good-manners.

One principal point of this art is to suit our behaviour to the three several degrees of men; our superiors, our equals, and those below us.

For instance, to press either of the two former to eat or drink is a breach of manners; but a tradesman or a farmer must be thus treated, or else it will be difficult to persuade them that they are welcome.

Pride, ill-nature, and want of sense, are the three great sources of ill-manners: without some one of these defects no man will behave himself ill for want of experience; or of what, in the language of fools, is called knowing the world.

Swift says, "I make a difference between good-manners and good-breeding; although, in order to vary my expression, I am sometimes forced to confound them. By the first I only understand the art of remembering and applying certain settled forms of general behaviour. But good-breeding is of a much larger extent: for, besides an uncommon degree of literature sufficient to qualify a gentleman for reading a play, or a political pamphlet, it taketh in a great compass of knowledge; no less than that of dancing, fighting, gaming, making the circle of Italy, riding the great horse, and speaking French; not to mention some other secondary or subaltern accomplishments, which are more easily acquired. So that the difference between good-breeding and good-manners lieth in this, that the former cannot be attained by the best understandings without study and labour; whereas a tolerable degree of reason will instruct us in every part of good-manners without other assistance.

"I can think of nothing more useful upon this subject than to point out some particulars wherein the very essentials of good-manners are concerned, the neglect or perverting of which doth very much disturb the good commerce of the world, by introducing a traffic of a mutual uneasiness in most companies.

"First, a necessary part of good-manners is a punctual observance of time at our own dwellings, or those of others, or at third places; whether upon matters of civility, business, or diversion; which rule, though it be a plain dictate of common reason, yet the greatest minister I ever knew was the greatest trespasser against it: by which all his business doubled upon him, and placed him in a continual arrear. Upon which I often used to rally him as deficient in point of good manners. I have known more than one ambassador and secretary of state, with a very moderate portion of intellectuals, execute their office with great success and applause by the mere force of exactness and regularity. If you duly observe time for the service of another it doubles the obligation; if upon your own account, it would be manifest folly, as well as ingratitude, to neglect it; if both are concerned, to make your equal or inferior attend on you to his own disadvantage is pride and injustice.

"Ignorance of forms cannot properly be styled ill-manners: because forms are subject to frequent changes; and consequently, being not founded upon reason, are beneath a wise man's regard. Besides, they vary in every country; and after a short period of time vary frequently in the same: so that a man who travelleth must needs be at first a stranger to them in every court through which he passeth; and perhaps, at his return, as much a stranger in his own; and, after all, they are easier to be remembered or forgotten than faces or names.

"Indeed, among the many impertinencies that superficial young men bring with them from abroad, this bigotry of forms is one of the principal, and more predominant than the rest; who look upon them not only as if they were matters capable of admitting of choice, but even as points of importance; and therefore are zealous upon all occasions to introduce and propagate the new forms and fashions they have brought back with them: so that, usually speaking, the worst-bred person in the company is a young traveller just arrived from abroad.

MA'NNIKIN. *s.* (*man* and *klein*, German.) A little man; a dwarf.

MANNINGTREE, a town in Essex, with a market on Tuesday; seated on the river Stour, which is here called Manningtree-water, 11 miles W. of Harwich, and 60 E.N.E. of London. Lon. 1. 12 E. Lat. 52. 0 N.

MA'NNISH. *a.* (from *man*.) Having the appearance of a man; bold; masculine; impudent (*Sidney*).

MANOMETER, or MANOSCOPE, an instrument to shew or measure the alterations in the rarity or density of the air.

The manometer differs from the barometer in this, that the latter only serves to measure the weight of the atmosphere or of the column of air over it; but the former, the density of the air in which it is found: which density depends not only on the weight of the atmosphere, but also on the action of heat and cold, &c. Authors, however, often confound the two together; and Mr. Boyle himself has given a very good manometer of his contrivance under the name of statical barometer, consisting of a bubble of thin glass, about the size of an orange, which being counterpoised when the air was in a mean state of density, by means of a nice pair of scales, sunk when the atmosphere became lighter, and rose as it grew heavier.

The manometer used by captain Phipps in his voyage towards the North Pole consisted of a tube of a small bore, with a ball at the end. The barometer being at 29·7, a small quantity of quicksilver was put into the tube, to take off the communication between the external air and that confined in the ball and the part of the tube below this quicksilver. A scale is placed on the side of the tube, which marks the degrees of dilatation arising from the increase of heat in this state of the weight of the air, and has the same graduation as that of Fahrenheit's thermometer, the point of freezing being marked 32. In this state, therefore, it will shew the degrees of heat in the same manner as a thermometer. But when the air becomes lighter, the bubble inclosed in the ball, being less compressed, will dilate itself, and occupy a space as much larger as the compressing force is less; therefore the changes arising from the increase of heat will be proportionably larger; and the instrument will shew the differences in the density of the air, arising from the changes in its weight and heat. Mr. Ramsden found, that a heat equal to that of boiling water increased the magnitude of the air from what it was at the freezing point, by $\frac{414}{1000}$ of the whole. Hence it follows, that the ball and the part of the tube below the beginning of the scale is of a magnitude equal to almost 414 degrees of the scale. If the height of both the manometer and thermometer be given, the height of the barometer may be thence reduced, by this rule;

as the height of the manom. increased by 414,
to the height of the thermom. increased by 414,
so is 29·7, to the height of the barometer;
or if *m* denote the height of the manometer, and *t* the height of the thermometer; then

$$m + 414 : t + 414 :: 29{\cdot}7 : \frac{t+414}{m+414} \times 29{\cdot}7,$$

which is the height of the barometer.

Other kinds of manometers were made use of by general Roy, in his attempts to correct the errors of the barometer. "They were (says he), of various lengths, from four to upwards of eight feet: they consisted of straight tubes, whose bores were commonly from one-fifteenth to one-twenty-fifth of an inch in diameter. The capacity of the tube was carefully measured, by making a column of quicksilver, about three or four inches in length, move along it from one end to the other. These spaces were severally marked, with a fine-edged file, on the tubes; and transferred from them to long slips of pasteboard, for the subsequent construction of the scales respectively belonging to each. The bulb, attached to one end of the manometer at the glass house, was of the form of a pear, whose point being occasionally opened, dry or moist air could be readily admitted, and the bulb sealed again, without any sensible alteration in its capacity. The air was confined by means of a column of quicksilver, long or short, and with the bulb downward or upwards, according to the nature of the proposed experiment. Here it must be observed, that from the adhesion of the quicksilver to the tube, the instrument will not act truly, except it be in a vertical position, and even then it is necessary to give it a small degree of motion, to bring the quicksilver into its true place, where it will remain in equilibrio, between the exterior pressure of the atmosphere on one side, and the interior elastic force of the confined air on the other. Pounded ice and water were used to fix a freezing point on the tube; and by means of salt and ice, the air was further condensed, generally four, and sometimes five or six degrees below zero. The thermometer and manometer were then placed in a tin vessel among water, which was brought into violent ebullition; where, having remained a sufficient time, and motion being given to the manometer, a boiling point was marked thereon. After this the fire was removed, and the gradual descents of the piece of quicksilver, corresponding to every twenty degrees of temperature in the thermometer, were successively marked on a deal rod applied to the manometer. It is to be observed, that both instruments, while in the water, were in circumstances perfectly similar; that is to say, the ball and bulb were at the bottom of the vessel. In order to be certain that no air had escaped by the side of the quicksilver during the operation, the manometer was frequently placed a second time in melting ice. If the barometer had not altered between the beginning and end of the experiment, the quicksilver always became stationary at or near the first mark. If any sudden change had taken place in the weight of the atmosphere during that interval, the same was noted, and allowance made for it in afterwards proportioning the spaces. Long tubes, with bores truly cylindrical, or of any uniform figure, are scarcely ever

met with. Such, however, as were used in these experiments generally tapered in a pretty regular manner from one end to the other. When the bulb was downwards, and the tube narrowed that way, the column of quicksilver confining the air, lengthened in the lower half of the scale, and augmented the pressure above the mean. In the upper half, the column being shortened, the pressure was diminished below the mean. In this case, the observed spaces both ways from the centre were diminished in the inverse ratio of the heights of the barometer at each space, compared with its mean height. If the bore widened towards the bulb when downwards, the observed spaces, each way from the centre, were augmented in the same inverse ratio; but in the experiments on air less dense than the atmosphere, the bulb being upwards, the same equation was applied with contrary signs; and if any extraordinary irregularity took place in the tube, the corresponding spaces were proportioned both ways from that point, whether high or low, that answered to the mean. The observed and equated manometrical spaces being thus laid down on the pasteboard containing the measures of the tube; the 212° of the thermometer, in exact proportion to the sections of the bore, were constructed alongside of them: hence the coincidences with each other were easily seen; and the number of thermometrical degrees answering to each manometrical space, readily transferred into a table prepared for the purpose." (*Phil. Trans.* vol. 67.)

MANOR, MANERIUM, (*à manendo*, because the usual residence of the owner), seems to have been a district of ground held by lords or great personages; who keep in their own hands so much land as was necessary for the use of their families, which were called *terræ dominicales*, or demesne lands; being occupied by the lord, or *dominus manerii*, and his servants. The other, or tenemental lands, they distributed among their tenants; which, from the different modes of tenure, were called and distinguished by two different names.—First, book-land, or charter-land, which was held by deed under certain rents and free services, and in effect differed nothing from free socage lands: and from hence have arisen most of the freehold tenants who hold of particular manors, and owe suit and service to the same. The other species was called folk-land, which was held by no assurance in writing, but distributed among the common folk or people at the pleasure of the lord, and resumed at his discretion; being indeed land held in villenage. See VILLENAGE.

The residue of the manor, being uncultivated, was termed the lord's waste, and served for public roads, and for common of pasture to the lord and his tenants. Manors were formerly called baronies, as they still are lordships; and each lord or baron was empowered to hold a domestic court, called the court-baron, for redressing misdemeanors and nuisances within the manor, and for settling disputes of property among the tenants. This court is an inseparable ingredient of every manor; and if the number of suitors should so fail, as not to leave sufficient to make a jury or homage, that is, two tenants at the least, the manor itself is lost. All manors existing at this day must have existed as early as king Edward the First. 2 Black. 90. See COURT-BARON.

MANQUE'LLER. *s.* (man and cwellan, Saxon.) A murderer; a mankiller; a manslayer (*Carew*).

MANSE. *s.* (*mansio*, Latin.) 1. Farm and land. 2. A parsonage house.

MANSE, MANSUS, MANSA, or MANSUM; in ancient law-books, denotes an house, or habitation, either with or without land. (See HOUSE and MANSION.) The word is formed *a manendo*, abiding; as being the place of dwelling or residence.

MANSE (Capital), *Mansum Capitale*, denotes the manor-house, or lord's court. See MANOR.

MANSUS PRESBYTERI, is a parsonage or vicarage house for the incumbent to reside in. This was originally, and still remains, an essential part of the endowment of a parish-church, together with the glebe and tythes. It is sometimes called presbyterium. See PRESBYTERY.

MANSFELD, a city of Germany, and capital of a county of the same name, in the circle of Upper Saxony. Lon. 12. 55 E. Lat. 51. 35 N.

MANSFERRY, in ornithology. See FALCO.

MANSFIELD, a town of England, in the county of Nottingham; anciently a royal demesne, to which the kings of England used to retire for the sake of hunting, in Sherwood Forest; and a manor was held by Henry Fauconberg, for shoeing the king's horse when he came to Mansfield. It has considerable trade in corn and malt, and a manufacture of stockings. In the year 1304, it was almost destroyed by fire. It has a weekly market on Thursday: fourteen miles N. Nottingham, and 138 N.N.W. London. Lon. 1. 9 W. Lat. 53 10 N.

MANSILLA, a town of Spain, in Leon, 15 miles S.W. of the city of Leon. Lon. 4. 55 W. Lat. 42. 30 N.

MA'NSION. *s.* (*mansio*, Latin.) 1. The lord's house in a manor. 2. Place of residence; abode; house (*Dryden*). 3. Residence; abode (*Denham*).

MANSLA'UGHTER. *s.* (*man* and *slaughter*.) 1. Murder; destruction of the human species (*Ascham*).

MANSLAUGHTER, in law, is killing a man without any malice prepense, or forethought. The English law very humanely makes a distinction between a hasty and deliberate act: as when two persons on a sudden quarrel, fight, and one is killed; yet as it is done in a sudden heat of passion, and not with any premeditated malice, it is manslaughter, and not murder. See MURDER.

This crime may be either voluntary, as on a sudden loss of temper; as if a man is greatly

provoked, and kills the agressor, it is manslaughter; but if it appears that there was a sufficient cooling time for the heat of anger to subside, this shews deliberate revenge, and amounts to murder. Or it may be involuntary, but in the commission of some unlawful act: in which latter respect it differs from homicide per infortunium: as if one shoots off a gun in a highway, and where people often meet, and kills a man; or if he is shooting at game, and is not qualified or licensed, and kills another, it is manslaughter. And, in general, when an involuntary killing happens, in consequence of an unlawful act, it will be murder or manslaughter, according to the act which occasioned it.

It is evident from the nature of this crime that there can be no accessaries, because it must be done without premeditation; but when two men once fell out, and immediately fought, and the sword of one was broken, and his friend lent him another, with which he killed his antagonist, it was made manslaughter in both. Again: there were two men in a room quarreling; a brother of one of them standing at the door, who could not get in, cried out to his brother to make him sure, and the brother killed his antagonist: it was likewise manslaughter in both.

But if any person shall stab another, not having his weapon drawn, or not strucken first, so that he dies within six months, although it be not of malice aforethought, it is felony without benefit of clergy.

This crime, though felony, is within benefit of clergy; and the offender should be burnt in the hand, and forfeit all his goods and chattels; but by stat. 19 Geo. III. c. 74, it is made lawful for the court to commute this punishment for a moderate fine and imprisonment.

MA'NSLAYER. *s.* (*man* and *slay.*) One that has killed another (*Numbers*).

MANSOURA, a town of Egypt, which has a considerable trade in rice and sal-ammoniac. Here are likewise vast chicken ovens. It is seated on the E. side of the Nile, 24 miles S.S.W. of Damietta, and 60 N. of Cairo. Lon. 31. 36 E. Lat. 31. 10 N.

MANSU'ETE. *a.* (*mansuetus*, Lat.) Tame; gentle; not ferocious (*Ray*).

MA'NSUETUDE. *s.* (*mansuetudo*, Lat.) Tameness; gentleness (*Herbert*).

MANSURA, a town of Turkey in Asia, in Irac Arabia, situate on the Euphrates, where it is joined by a branch of the Tigris, 110 miles W.N.W. of Bassora.

MANTACA. See MATACA.

MANTCHEW TARTARS, a branch of the Mogul Tartars, whose ancestors conquered China in the 13th century, but were expelled by the Chinese in 1368. They inhabit the three departments of E. Chinese Tartary, called Leoa-tong, Kirin, and Tcitcicar. They retain the customs they brought from China.

MA'NTEL. *s.* (*mantel*, old French.) Work raised before a chimney to conceal it (*Wotton*).

MANTELE'T. *s.* (*mantelet*, French.) A small cloak worn by women.

MANTELETS, in the art of war, a kind of moveable parapets made of planks about three inches thick, nailed one over another, to the height of almost six feet, generally cased with tin, and set upon little wheels, so that in a siege they may be driven before the pioneers, and serve as blinds to shelter them from the enemy's small shot.

MANTES, a considerable town of France, in the department of Seine and Oise. King Philip Augustus died here in 1223; and here is the tomb of king John, in the church of a late chapter which he founded. The wines from the vineyard of the late Celestins, out of the town, are famous. Mantes is seated on the Seine, and over it is a bridge, the great arch of which, although elliptic, is 120 feet wide. It is 31 miles N.W. of Paris. Lon. 1. 51 E. Lat 49. 1 N.

MANTICORA, in zoology, a genus of the class insecta, order coleoptera. Antennas filiform, the joints cylindrical; feelers four, filiform; thorax rounded before, emarginate behind; head projecting; mandibles exserted; shells united; wingless. One species only; M. maxillosa; inhabitant of the Cape of Good Hope, with large black body, simple black legs.

MANTIGER, or MANTEGAR. See SIMIA.

MANTILE, in surgery, the name of a bandage.

MANTINEA, in ancient geography, a town of Arcadia in Peloponnesus, was taken by Adratus and Antigonus, and from the latter it was afterwards called Antigonia. It is famous for the battle which was fought there between Epaminondas at the head of the Thebans, and the combined force of Lacedæmon, Achaia, Elis, Athens, and Arcadia, about 363 years before Christ. The Theban general was killed in the engagement, and from that time Thebes lost its consequence among the Grecian states.

MANTIS. Soothsayer. In zoology, a genus of the class insecta, order hemiptera. Head unsteady; mouth armed with jaws; feelers filiform; wings four, membranaceous, convolute, the under ones plaited; fore-legs compressed, serrate or toothed beneath, armed with a single claw and lateral jointed process; the four hind ones smooth, and formed for walking; thorax (mostly) linear, elongated, and narrow. Sixty-four species, scattered over the globe, but all exotics: two or three of them worshipped by the Hottentots, as the ibis and ichneumon were of old by the Egyptians.

The most remarkable of these animals is the mantis gongylodes of China. The thorax is uncommonly long and narrow; the head small and flat, with two short filiform antennæ; behind these, two large polished eyes are placed; the rostrum has the shape of an awl, but often split towards the extremity into two points. The elytra, which cover two-thirds of the body of the insect, are reticulated, and crossed the one over the other; the wings which they cover are veined and diaphanous. The four hind legs have the appearance of being

winged, on account of those large membranous lobes which immerge from their joints. The anterior pair are armed with spines at their first articulation, and towards their extremities they are serrated on one side.

The insects of this genus possess a form the most romantic and extraordinary that is perhaps presented by any animated being; and so powerfully have their singular attitudes operated on the minds of the credulous and ignorant, that the superstition of other countries than Egypt has invested them with powers altogether unexemplified by any part of the history of animated nature. By the singular manner in which the mantis stretches out its fore-legs, it has acquired the reputation of a diviner, who could unfold all the secrets in the bosom of futurity; and because the insect often sits upon its four hind-legs, having the two fore ones raised up and folded together, the believing multitude have supposed it to be then holding intercourse with the Supreme Power, in the exercise of devotion, a circumstance from which it has obtained from the peasants of Languedoc the name of Pregadiou, or the God-prayer. It is in that province, where these animals abound, that the country people have also ascribed to the soothsayer another very commendable quality; that of obligingly shewing the way to strangers. This it is supposed to do, by that peculiar habit which it has of stretching its fore-legs sometimes to the right, and sometimes to its left side. These superstitions of the vulgar have been as favourable to the security of these animals, as they are disgraceful to human reason; for they have procured them protection from injury of every kind; the person who has the temerity to violate their hallowed frames being accounted guilty of sacrilege.

MANTLE, or Mantle-tree, in architecture, the lower part of the chimney, or that piece of timber which is laid across the jaumbs, and sustains the compartments of the chimney-piece.

Mantle, or Mantling, in heraldry, that appearance of folding of cloth, flourishing, or drapery, which in any achievement is drawn about a coat of arms. See Heraldry.

Ma'ntle. *s.* (*mantell*, Welsh.) A kind of cloak or outer garment (*Hayward*).

To Ma'ntle *v. a.* (from the verb.) To cloak; to cover; to disguise (*Shakspeare*).

To Ma'ntle. *v. n.* 1. To spread the wings as a hawk in pleasure (*Milton*). 2. To joy; to revel (*Spenser*). 3. To be expanded; to spread luxuriantly (*Gay*). 4. To gather any thing on the surface; to froth (*Pope*). 5. To ferment; to be in sprightly agitation (*Smith*).

MANTO, in fabulous history, a daughter of the prophet Tiresias, endowed with the gift of prophecy. She was made prisoner by the Argives when the city of Thebes fell into their hands, and was sent to the god of Delphi, as the most valuable present they could make. Manto remained some time at Delphi, where she gave oracles. From Delphi she came to Claros in Ionia, where she established an oracle of Apollo. Here she married Rhadius the sovereign of the country. Manto afterwards visited Italy, where she married Tiberinus the king of Alba, or, the god of the river Tiber. From this marriage sprang Ocnus, who built a town in the neighbourhood, which, in honour of his mother, he called Mantua. She received divine honours after death.

MANTRAP, a well-known engine, constructed like a rat-trap, but of a larger size, for the purpose of catching petty depredators in gardens, orchards, &c.

Mantraps of this construction, however, inflict deep and sometimes dangerous wounds upon the depredator: it became, therefore, desirous to invent others which should secure a thief without much injuring him.

A contrivance for this purpose by sir Theophilus Biddulph; it consisted of a wooden box, containing two springs in iron barrels, and two chains passing over and round them; when this was set, the chains were withdrawn from round the barrels, and extended to a certain distance. A trigger then kept the trap from closing, the whole was then covered over with thin iron plates, so that if a person set his foot on these plates his leg dropped into the box, and the chains closed round it and held the leg; but as the box was about three feet square and a foot deep, it was requisite that it should at setting be let into the ground, which would be a work of considerable labour; and when done it would be difficult to dispose of the stuff from the hole, or to conceal the trap; and as the whole apparatus was cumbersome and expensive, it appeared to Mr. R. Salmon, of Woburn, not to be well applicable in practice. This gentleman, therefore, devised one which when set only requires that the two keys be withdrawn, and that the trap be covered with a few loose leaves or mould. To the trap he has attached a piece of chain and a screw to be screwed into the ground, so as to prevent its being carried away; against any person that may be caught such a precaution is perhaps unnecessary, for any person who is caught will find the jaws of the trap close so fast on the leg that he cannot drag the trap far without great pain, and will consequently be glad to stand still, and to call out for relief.

The following description of Mr. Salmon's mantrap is copied from the 27th vol. of the Transactions of the Society of Arts.

The principal figure (fig. 1. pl. 102.) is a perspective view of this machine. Fig. 1, ABC is a frame of wrought iron, about 18 inches square; it has an eye projecting from it to receive a short chain, the other end of which is fastened to an iron screw, shewn seperately at D, screwed into the earth by the key or handle E; this screw is about 14 inches long, and, when screwed into hard ground, will hold so firmly, that there is no danger of its being drawn out, even by two or three men, and having a small square end, it cannot be turned without the key or handle E; so that an offender would find it extremely difficult to remove the trap: *efeg* are two iron frames moving on centres in the frame ABC; these frames

have a constant tendency to close together, by means of two springs, *pp*, fixed in the frame AB, and acting against pins projecting from the upright sides of the moveable frame *ee*; *kk* are two small iron rods jointed to the upper rod of the moveable frame g, and passing through small locks, *ll*, fixed to the other frame *f*. These locks contain clicks which are pressed by springs into the teeth, as may be seen upon the rods *kk*, so as to prevent the two bars *fg* from being drawn asunder when they have been closed by means of the springs *pp*. The internal mechanism of the locks is explained by figures 2, 3, on a larger scale at LM, in the same plate; one side of the lock is supposed to be removed to exhibit its interior parts, where *k* represents the rack, or that part of the rod which is cut into teeth, *r* is the click, which engages the teeth of the rack, and prevents its being drawn through the lock: the click is pressed against the teeth of the rack by a spring, which is plainly seen in the figures; the locks are attached to the ends of the bar *f* of the moveable frame, by the bar passing through the locks, and when the lids are rivetted on it is confined in such a manner that it cannot be got out. But as it is necessary to open the bars *fg*, and draw the clicks back from the teeth of the racks, Mr. Salmon has contrived two different methods of accomplishing this object. Figure 3, M, is that which is used in the model left at the Society's Repository. A small key or screw S is put down through a hole in the lid of the lock, and is received into a hole lapped with a screw in the click; by turning the screw it lifts the click out of the teeth of the rack; so that the moving frames *fg* can be opened apart from each other, till they lie flat upon the frame AB. The iron cross *m* is then put between the two rods *fg*, the screws S of the two locks are to be withdrawn from the locks, and the trap is set for use. If an offender should place his foot within the square of the frame, he would tread down the cross *m*, and having thus removed the obstruction, the two frames *efeg* are closed together by the springs *pp*, so that the bars *fg* enclose his leg, and the clicks in the locks prevent the bars being opened without the screws S. In some of the machines which Mr. Salmon has made since the model was deposited with the society, the locks are made like figure 2, L, where a common key is to be introduced, and, when turned round, catches the tail of the click; it may have wards to prevent the using of a false key, though no ward is shewn in the plate.

Part of the screw D for securing the trap from being carried away by depredators is shewn on a larger scale at N, in order that the peculiar form of its threads may be better seen, which fix it firmly in the earth. Such screws would be very serviceable in fastening horses at grass, &c.

MANTUA, or MANTUAN, a duchy of Italy, lying along the river Po, which divides it into two parts. It is bounded on the N. by the Veronese, on the S. by the duchies of Reggio, Modena, and Mirandola; on the E. by the Ferrarese; and on the W. by the Cremonese. It is 50 miles long and 27 broad, and fruitful in corn, pastures, flax, fruits, and excellent wine. Charles IV, duke of Mantua, a prince of the empire, having taken part with the French, in the dispute relating to the succession of Spain, was put under the ban of the empire, and died in 1708. Having no heirs, the emperor kept the Mantuan, and the duke of Savoy had Montferrat, which were confirmed to them by subsequent treaties. After the death of the emperor in 1740, his eldest daughter, the queen of Hungary, kept possession of the Mantuan; and the governor of the Milanese had the administration of affairs. The Mantuan comprehends the duchies of Mantua and Sabioneta; the principalities of Castiglione, Solforina, and Bosolo; likewise the county of Novellara. The principal rivers of this country are the Po, Oglio, and Minchio.

MANTUA, the capital of a duchy of the same name, in Italy, with an archbishop's see, and a university, seated on an island in the middle of a lake. The streets are broad and straight, and it has eight gates, twenty-one parishes, forty convents and nunneries, a quarter for the Jews to live in, and above 16,000 inhabitants. It is very strong by situation as well as by art, and there is no coming at it but by two causeways, which cross the lake; for which reason, it is one of the most considerable fortresses in Europe. It was greatly noted for its silks, and silk manufactures, which are now much decayed. The air in the summer is very unwholesome; and the lake is formed by the inundations of the Mincio. Virgil was born at a village near this city. Mantua was besieged by the French, for above six months, in 1796, and surrendered to them February 2, 1797. On the recommencement of the war, it was attacked by the Austrian and Russian army, to which it surrendered July 30, 1799, after a short siege; and finally, not only this city, but the whole country was subdued by Buonaparte. It is 35 miles N.E. of Parma, 22 S.W. of Verona, and 220 N. by W. of Rome. Lon. 10. 50 E. Lat. 45. 10 N.

MA'NTUA. *s.* (perhaps corrupted from *manteau*, French.) A lady's gown (*Pope*).

MA'NTUAMAKER. *s.* (*mantua* and *maker*.) One who makes gowns for women (*Addison*).

MANTUAN (Baptist), a famous Italian poet, born at Mantua in 1448. He took his name from the town; not having a right to that of his father, as being a natural son. In his youth he applied himself to Latin poetry, which he cultivated all his life; for it does not appear that he wrote any thing in Italian. He entered among the Carmelites, and became general of the order; though he quitted that dignity upon some disgust in 1515, and died the year following. The duke of Mantua, some years after, erected a marble statue to his memory, crowned with laurel, and placed it next to Virgil. His works were collected and published at Paris in three volumes folio in 1513,

with the commentaries of St. Murrhon, S. Brant, and I. Badius.

MA'NUAL. *a.* (*manualis*, Lat.) 1. Performed by the hand (*Dryden*). 2. Used by the hand (*Clarendon*).

MANUAL EXERCISE, in the army, consists in the observance of certain words of command, appointed for this purpose. When a regiment is drawn up, or paraded for exercise, the men are placed three deep, either by companies, or divided into platoons, with the grenadiers on the right. When soldiers are drawn up for exercise, the ranks and files should be exactly even; and each soldier should be instructed to carry his arms well, to keep his firelock steady and even upon his shoulder, with the right hand hanging down, and the whole body without constraint. The distances between the files must be equal, and the ranks eight feet distant from each other. Every motion should be performed with life, and the greatest exactness observed in all firings, wheelings, and marching; and therefore a regiment should never be under arms longer than two hours.

An abstract of the words of command at the manual exercise is given in several of our Encyclopædias; but as a far more complete direction may be bought for sixpence, by those who need them (seldom, we apprehend, readers of works like this), we shall excuse ourselves from inserting them here.

MANUAL, is the name of a service-book used in the church of Rome, containing the rites, directions to the priests, and prayers used in the administration of baptism and other sacraments; the form of blessing holy water, and the whole service used in processions. Hence,

MA'NUAL. *s.* A small book, such as may be carried in the hand (*Stillingfleet*).

MANU'BIAL. *a.* (*manubiæ*, Latin.) Belonging to spoil; taken in war.

MANU'BRIUM. *s.* (Latin.) A handle (*Boyle*).

MANUDU'CTION. *s.* (*manuductio*, Lat.) Guidance by the hand (*South*).

MANUDUCTOR, a name given to an ancient officer in the church; who, from the middle of the choir, where he was placed, gave the signal for the choristers to sing, and marked the measure, beat time, and regulated the music. The Greeks called him mesachoros, because seated in the middle of the choir: but in the Latin church he was called manuductor; from *manus* and *duco*, I lead; because he led and guided the choir by the motions and gesture of the hand.

MANUFA'CTURE. *s.* (*manus* and *facio*, Latin.) The practice of making any piece of workmanship. 2. Any thing made by art (*Addison*).

To MANUFA'CTURE. *v. a.* (*manufacturer*, French.) 1. To make by art and labour; to form by workmanship. 2. To employ in work; to work up.

MANUFA'CTURER. *s.* (*manufacturier*, Fr.) A workman; an artificer (*Watts*).

MANUFACTURES may be defined, the arts by which natural productions are brought into the state or form in which they are consumed or used. The principal manufactures are those which fabricate the various articles of clothing; as the woollen-manufacture, the leather-manufacture in part, the cotton-manufacture, the linen-manufacture, and the silk-manufacture; others supply articles of household furniture, as the manufactures of glass, porcelain, earthenware, and of most of the metals in part; the iron-manufacture furnishes implements of agriculture, and weapons of war; and the paper-manufacture supplies a material for communicating ideas and perpetuating knowledge. Manufactures had begun to flourish in different parts of Europe, long before they were attempted in Britain; the few articles of this description which were in request being obtained in exchange for wool, hides, tin, and such other produce as the country in a very uncultivated state could supply. In 1337, it was enacted, that no more wool should be exported; that no one should wear any but English cloth; that no cloths made beyond seas should be imported; that foreign clothworkers might come into the king's dominions, and should have such franchises as might suffice them. Before this time the English were little more than shepherds, and wool-sellers. The progress of improvement since the establishment of manufactures in this country has in most instances been remarkably great, particularly of late years, in consequence of an increased knowledge of the properties of various materials, vast improvements in all kinds of machinery, and the great capitals invested in most of the different branches. The value of British manufactures exported to all countries, on an average of six years, ending with 1774, was 10,342,019l.: the American war suspended for a time an important market for several of our manufactures, in consequence of which the total amount exported had fallen in 1781 to 7,633,332l. and on an average of six years, ending with 1783, it was 8,616,660l. During the peace which followed, the export trade rapidly revived, and, in the year preceding the war with France, had attained to a magnitude beyond all former example; it was checked a little by the mercantile embarrassments in 1793, but a few years after the unsettled state of several of the principal European powers threw many additional branches of foreign trade into the hands of our merchants, and carried the export of our manufactures to its present important extent. The real value of British produce and manufactures exported, as far as it can be ascertained, under the ad valorem duties, or computed at the average current prices of the goods, amounts to more than forty millions sterling.

Manufactures furnish employ for numerous families, but at the same time they greatly contribute to that depravity of manners for which the labouring classes are, at present, but too conspicuous. Indeed, it is a melancholy fact, that so long as agriculture is but partially attended to, and in a manner neglected, for the

more speedy acquisition of wealth, the progress of luxury necessarily tends to change the most virtuous habits, and to vitiate the morals of a mercantile nation.

By the 23 Geo. II. c. 13, it is enacted, that if any person export the tools or utensils used either in the silk, linen, or woollen manufactures, he incurs a forfeiture, and the sum of 200l.; and, if the captain of the ship be acquainted with such illegal proceeding, he is liable to pay a fine of 100l.—The forfeiture of the articles, and of 200l. is farther imposed on all persons collecting them for the purpose of exportation; and, if any captain of a king's ship, or officer of the customs, knowingly suffer such exportation, both (by the 21 Geo. III. c. 37), incur a penalty of 200l. lose their employment, and are for ever incapacitated from holding any office under government. This act likewise subjects all persons having tools in their possession, or procuring them to be made, with a view to exportation, to the forfeiture of the same, as well as of the sum of 200l. and to imprisonment for the term of 12 months. Lastly, the 22 Geo. III. c. 60, declares, that every person exporting such tools shall forfeit them, together with the sum of 500l. See CLOTH, COTTON, IRON, LINEN, &c.

MANU'LEA, in botany, a genus of the class didynamia, order angiospermia. Calyx five-parted; corol with five-parted subulate border; the four upper divisions more united; capsule two-celled, many-seeded. Seventeen species; all herbaceous plants of the Cape.

To MANUM'ISE. *v. n.* (*manumitto*, Lat.) To set free; to dismiss from slavery (*Knolles*).

MANUMI'SSION. *s.* (*manumissio*, Lat.) The act of giving liberty to slaves (*Brown*).

To MANUMI'T. *v. a.* (*manumitto*, Latin.) To release from slavery (*Dryden*).

MANU'RABLE. *a.* (from *manure*.) Capable of cultivation (*Hale*).

MANU'RANCE. *s.* (from *manure*.) Agriculture; cultivation (*Spenser*).

To MANU'RE. *v. a.* (*manouvrer*, French.) 1. To cultivate by manual labour (*Milton*). 2. To dung; to fatten with composts (*Woodw.*). 3. To fatten as a compost (*Addison*).

MANU'RE. *s.* (from the verb.) Soil to be laid on land; dung to fatten land. See HUSBANDRY.

MANU'REMENT. *s.* (from *manure*.) Cultivation; improvement (*Wotton*).

MANU'RER. *s.* (from the verb.) He who manures land; a husbandman.

MA'NUSCRIPT. *s.* (*manuscriptum*, Lat.) A book written, not printed (*Wotton*).

MANUTIUS (Aldus), the first of those celebrated Venetian printers who were as illustrious for their learning as for uncommon skill in their profession. He was born at Bassano in Italy about the middle of the 15th century; and hence is sometimes called Basianus, though generally better known by the name of Aldus. He was the first who printed Greek neatly and correctly; and acquired so much reputation by it, that whatever was finely printed was proverbially said to have "come from the press of Aldus." We have a kind of Greek grammar of his; with notes upon Homer, Horace, &c. He died at Venice, where he exercised his profession, in 1516.

MANUTIUS (Paulus), son of the former, was brought up to his father's profession. He was more learned than him; and he acquired, by continual reading of Tully, such a purity in writing Latin, that even Scaliger allows a Roman could not exceed. Pope Pius IV. placed him at the head of the apostolical press, and gave him the charge of the Vatican library. His Epistles are infinitely laboured, and very correct; but, as may be said of most of the Ciceronians, they contain scarcely any thing but mere words. This constant reading of Tully, however, together with his profound knowledge of antiquity, qualified him extremely well for an editor of Tully; whose works he accordingly published, with commentaries on them, in 4 vols. folio, at Venice, in 1523. He died in 1574.

MANUTIUS (Aldus), the younger, the son of Paulus, and the grandson of Aldus, was esteemed one of the greatest geniuses and most learned men of his time. Clement VIII. gave him the direction of the Vatican printing-house; but probably the profits of that place were very small, since Manutius was obliged, for his subsistence, to accept of a professor of rhetoric's chair, and to sell the excellent library that was in his family, which his father, his uncle, and his great-uncle, had collected with extraordinary care, and which it is said contained 80,000 volumes. He died at Rome in 1597, without any other recompense than the praises due to his merit. He wrote, 1. Commentaries on Cicero, 2. A Treatise on Orthography. 3. Three books of Epistles; and other works in Latin and Italian, which are esteemed.

MA'NY. *a.* comp. *more.* superl. *most* (mænig, Saxon.) 1. Consisting of a great number: numerous; more than few (*Digby*). 2. Marking number indefinite (*Exodus*).

MA'NY. *s.* 1. A multitude; a company; a great number; people (*Spenser*). 2. *Many* is used much in composition.

MANY-CLEFT or MULTIFID LEAF, in botany. (See CLEFT.) It is applied also to the corol.

MANY-FLOWERED GLUME and PERIANTH, in botany. Gluma multiflora. Perianthium multiflorum. Inclosing several flowers. Many-flowered peduncle and stem. Pedunculus and caulis multiflorus. Supporting several flowers.

MANY-FOLD COROL, in botany. See MULTIPLICATE.

MANY-PETALLED COROL, in botany. Polypetala. Opposed by Linnéus to a monopetalous or one-petalled corol. Other writers have commonly given separate names to the corol, according to the number of petals, as far as six; calling the rest polypetalous. Linnéus also makes the distinction of dipetalous, tripetalous, &c. but calls them all polypetalous.

MANY-VALVED GLUME, in botany. Multivalvis. Consisting of more than two valves, which is the common number.

MANYCO'LOURED. *a.* (*many* and *colour.*) Having various colours (*Donne*).

MANYCO'RNERED. *a.* (*many* and *corner.*) Polygonal; having many corners (*Dryden*).

MANYHEA'DED. *a.* (*many* and *head.*) Having many heads (*Sidney*).

MANYLA'NGUAGED. *a.* (*many* and *language.* Having many languages (*Pope*).

MANYPE'OPLED. *a.* (*many* and *people.*) Numerously populous (*Sandys*).

MANYTI'MES, an adverbial phrase. Often; frequently (*Addison*).

MAOUNA, one of the Navigators Islands, in the S. Pacific Ocean. Here, in 1787, M. de la Peyrouse, commander of the French ships the Boussole and Astrolabe, met with his first fatal accident; M. de Langle, captain of the Astrolabe, with 11 officers and sailors, being massacred by the natives. Lon. 169. 0 W. Lat. 14. 19 S.

MAP, a plane figure representing the surface of the earth, or some part of it; being a projection of the globular surface of the earth, exhibiting countries, seas, rivers, mountains, cities, &c. in their due positions, or nearly so.

Maps are either Universal or Particular, that is Partial.

MAPS (Universal), are such as exhibit the whole surface of the earth, or the two hemispheres.

MAPS (Particular, or Partial), are those that exhibit some particular region, or part of the earth.

Both kinds are usually called Geographical, or Land-Maps, as distinguished from Hydrographical, or Sea-Maps, which represent only the seas and sea-coasts, and are properly called Charts.

Anaximander, the scholar of Thales, it is said, about 400 years before Christ, first invented geographical tables, or maps. The Pentingerian Tables, published by Cornelius Pentinger, of Ausburgh, contain an itinerary of the whole Roman Empire; all places, except seas, woods, and desarts, being laid down according to their measured distances, but without any mention of latitude, longitude, or bearing.

The maps published by Ptolemy of Alexandria, about the 144th year of Christ, have meridians and parallels, the better to define and determine the situation of places, and are great improvements on the construction of maps. Though Ptolemy himself owns that his maps were copied from some that were made by Marinus, Tirus, &c. with the addition of some improvements of his own. But from his time till about the 14th century, during which geography and most sciences were neglected, no new maps were published. Mercator was the first of note among the moderns, and next to him Ortelinus, who undertook to make a new set of maps, with the modern divisions of countries and names of places; for want of which, those of Ptolemy were become almost useless. After Mercator, many others published maps, but for the most part they were mere copies of his. Towards the middle of the 17th century, Bleau in Holland, and Sanson in France, published new sets of maps, with many improvements from the travellers of those times, which were afterwards copied, with little variation, by the English, French, and Dutch; the best of these being those of Vischer and De Witt. And later observations have furnished us with still more accurate and copious sets of maps, by De Lisle, Robert, Wells, &c. &c. Concerning maps, see Varenius's Geog. lib. 3, cap. 3, prop. 4; Fournier's Hydrog. lib. 4, c. 24; Wolfius's Elem. Hydrog. c. 9; John Newton's Idea of Navigation; Mead's Construction of Globes and Maps; Wright's Constructions of Maps, &c.

MAPS (Construction of). Maps are constructed by making a projection of the globe, either on the plane of some particular circle, or by the eye placed in some particular point, according to the rules of perspective, &c.; of which there are several methods.

First.—To construct a Map of the World, or a general Map.

1st Method.—A map of the world must represent two hemispheres; and they must both be drawn upon the plane of that circle which divides the two hemispheres. The first way is to project each hemisphere upon the plane of some particular circle, by the rules of orthographic projection, forming two hemispheres, upon one common base or circle. When the plane of projection is that of a meridian, the maps will be the east and west hemispheres, the other meridians will be ellipses, and the parallel circles will be right lines. Upon the plane of the equinoctial, the meridians will be right lines crossing in the centre, which will represent the pole, and the parallels of latitude will be circles having that common centre, and the maps will be the northern and southern hemispheres. The fault of this way of drawing maps is, that near the outside the circles are too near one another; and therefore equal spaces on the earth are represented by very unequal spaces upon the map.

2d Method.—Another way is to project the same hemispheres by the rules of Stereographic projection; in which way, all the parallels will be represented by circles, and the meridians by circles or right lines. And here the contrary fault happens, viz. the circles towards the outsides are too far asunder, and about the middle they are too near together.

3d Method.—To remedy the faults of the two former methods, proceed as follows. First, for the east and west hemispheres, describe the circle PENQ for the meridian (Pl. 102, fig. 1), or plane of projection; through the centre of which draw the equinoctial EQ, and axis PN perpendicular to it, making P and N the north and south pole. Divide the quadrants PE, EN, NQ, and QP into 9 equal parts,

each representing 10 degrees, beginning at the equinoctial EQ: divide also CP and CN into 9 equal parts, beginning at EQ; and through the corresponding points draw the parallels of latitude. Again, divide CE and CQ into 9 equal parts; and through the points of division, and the two poles P and N, draw circles, or rather ellipses, for the meridians. So shall the map be prepared to receive the several places and countries of the earth.

Secondly, for the north or south hemisphere, draw AQBE, for the equinoctial (fig. 2), dividing it into the four quadrants EA, AQ, QB, and BE; and each quadrant into 9 equal parts, representing each 10 degrees of longitude; and then, from the points of division, draw lines to the centre C, for the circles of longitude. Divide any circle of longitude, as the first meridian EC, into 9 equal parts, and through these points describe circles from the centre C, for the parallels of latitude; numbering them as in the figure.

In this 3d method, equal spaces on the earth are represented by equal spaces on the map, as near as any projection will bear; for a spherical surface can no way be represented exactly upon a plane. Then the several countries of the world, seas, islands, sea-coasts, towns, &c. are to be entered in the map, according to their latitudes and longitudes.

In filling up the map, all places representing land are filled with such things as the countries contain; but the seas are left white; the shores adjoining to the sea being shaded. Rivers are marked by strong lines, or by double lines, drawn winding in form of the rivers they represent; and small rivers are expressed by small lines. Different countries are best distinguished by different colours, or at least the borders of them. Forests are represented by trees; and mountains shaded to make them appear. Sands are denoted by small points or specks; and rocks under water by a small cross. In any void space, draw the mariner's compass, with the 32 points or winds.

II.—*To draw a Map of any particular Country.*

1st Method.—For this purpose its extent must be known, as to latitude and longitude; as suppose Spain, lying between the north latitudes 36 and 44, and extending from 10 to 23 degrees of longitude; so that its extent from north to south is 8 degrees, and from east to west 13 degrees.

Draw the line AB for a meridian passing through the middle of the country (fig. 3), on which set off 8 degrees from B to A, taken from any convenient scale; A being the north, and B the south point. Through A and B draw the perpendiculars CD, EF, for the extreme parallels of latitude. Divide AB into 8 parts, or degrees, through which draw the other parallels of latitude, parallel to the former.

For the meridians; divide any degree in AB into 60 equal parts, or geographical miles. Then, because the length of a degree in each parallel decreases towards the pole, from the table shewing this decrease, under the article DEGREE, take the number of miles answering to the latitude of B, which is $48\frac{1}{2}$ nearly, and set it from B, 7 times to E, and 6 times to F; so is EF divided into degrees. Again, from the same table take the number of miles of a degree in the latitude A, viz. $43\frac{1}{4}$ nearly; which set off, from A, 7 times to C, and 6 times to D. Then from the points of division in the line CD, to the corresponding points in the line EF, draw so many right lines, for the meridians. Number the degrees of latitude up both sides of the map, and the degrees of longitude on the top and bottom. Also, in some vacant place make a scale of miles; or of degrees, if the map represent a large part of the earth; to serve for finding the distances of places upon the map.

Then make the proper divisions and subdivisions of the country; and having the latitudes and longitudes of the principal places, it will be easy to set them down in the map: for any town, &c. must be placed where the circles of its latitude and longitude intersect. For instance, Gibraltar, whose latitude is 36° 11′, and longitude 12° 27′, will be at G: and Madrid, whose latitude is 40° 10′, and lon. 14° 44′, will be at M. In like manner the mouth of a river must be set down; but to describe the whole river, the latitude and longitude of every turning must be marked down, and the towns and bridges by which it passes. And so for woods, forests, mountains, lakes, castles, &c. The boundaries will be described, by setting down the remarkable places on the sea-coast, and drawing a continued line through them all. And this way is very proper for small countries.

2d. Method.—Maps of particular places are but portions of the globe, and therefore may be drawn after the same manner as the whole is drawn. That is, such a map may be drawn either by the orthographic or stereographic projection of the sphere, as in the last prob. But in partial maps, an easier way is as follows. Having drawn the meridian AB (fig. 3), and divided it into equal parts as in the last method, through all the points of division draw lines perpendicular to AB, for the parallels of latitude; CD, EF being the extreme parallel. Then to divide these, set off the degrees in each parallel, diminished after the manner directed for the two extreme parallels CD, EF, in the last method: and through all the corresponding points draw the meridians, which will be curve lines; which were right lines in the last method; because only the extreme parallels were divided by the table. This method is proper for a large tract, as Europe, &c.: in which case the parallels and meridians need only be drawn to every 5 or 10 degrees. This method is much used in drawing maps; as all the parts are nearly of their due magnitude, but a little distorted towards the outside, from the oblique intersections of the meridians and parallels.

3d Method.—Draw PB of a convenient length, for a meridian; divide it into 9 equal parts, and through the points of division, describe as many circles for the parallels of latitude from the centre P, which represents the pole. Suppose AB (fig. 4) the height of the

map; then CD will be the parallel passing through the greatest latitude, and EF will represent the equator. Divide the equator EF into equal parts, of the same size as those in AB, both ways, beginning at B. Divide also all the parallels into the same number of equal parts, but lesser, in proportion to the numbers for the several latitudes, as directed in the last method for the rectilineal parallels. Then through all the corresponding divisions, draw curve lines, which will represent the meridians, the extreme ones being EC and FD. Lastly, number the degrees of latitude and longitude, and place a scale of equal parts, either of miles or degrees, for measuring distances.—This is a very good way of drawing large maps, and is called the globular projection; all the parts of the earth being represented nearly of their due magnitude, excepting that they are a little distorted on the outsides.

When the place is but small that a map is to be made of, as if a county was to be exhibited; the meridians, as to sense, will be parallel to one another, and the whole will differ very little from a plane. Such a map will be made more easily than by the preceding rules. It will here be sufficient to measure the distances of places in miles, and so lay them down in a plane rectangular map. But this belongs more properly to surveying.

The Use of Maps is obvious from their construction. The degrees of the meridians and parallels shew the latitudes and longitudes of places, and the scale of miles annexed, their distances; the situation of places, with regard to each other, as well as to the cardinal points, appears by inspection; the top of the map being always the north, the bottom the south, the right hand the east, and the left hand the west; unless the compass, usually annexed, shew the contrary. (*Hutton's Dict.*) See also *Phil. Trans.* new ab. part 42.

To MAP. *v. a.* (from the noun.) To delineate; to set down (*Shakspeare*).

MAPA'NIA, in botany, a genus of the class triandria, order monogynia. General involucre three-leaved; calyx six-valved; coroless. A grass of the woods of Guiana.

MAPLE, in botany. See ACER.

MAPLE SUGAR. See SUGAR.

MAPLETOFT (Dr. John), descended from a good family in Huntingdonshire, was born in 1631. He was educated in Trinity-college, Cambridge, and qualified himself for the profession of physic; and in 1675 was chosen professor of that art at Gresham-college. He translated Dr. Sydenham's Observationes medicæ circa morborum acutorum historiam et curationem into the Latin, and Sydenham dedicated them to Mapletoft. He married in 1679, and soon after transferred his studies from physic to divinity; took orders; obtained the vicarage of St. Laurence Jewry, with the lectureship of St. Christopher's in London; and having been a benefactor to Sion-college, was, in 1707, elected president. He continued to preach in the church of St. Laurence Jewry till he was above 80 years of age; and in his decline printed a book entitled, The principles and duties of the Christian religion, &c. 8vo. 1710, a copy of which he sent to every house in his parish. He was a polite scholar; and besides some other pieces on moral and theological subjects, there are in the Appendix to Ward's Lives of the professors of Gresham-college, three Latin lectures read there by him, on the origin of the art of medicine, and the history of its invention.

MAPPA, in the public games of the Roman circus, was a napkin hung out at the prætor's or other great magistrate's seat, as a signal for the race or other diversions to begin. The mappa was received by the mapparius, or person who held it, from the consul, prætor, or other great officer.

MA'PPERY. *s.* (from *map.*) The art of planning and designing (*Shakspeare*).

To MAR. *v. a.* (amyrran, Saxon.) To injure; to spoil; to hurt; to mischief; to damage (*Dryden*).

MARACAYBO, a lake, or arm of the sea, in Terra Firma, lying in about 70° W. lon. and 10° N. lat. It opens into the Carribbean sea, is defended by strong forts, and has several Spanish towns seated on the coast.

MARACAYBO, a considerable town of Terra Firma, in the province of Venezuela. It carries on a great trade in skins and chocolate, which is the best in America; and it has very fine tobacco. It was taken by the French bucaniers in 1666 and 1678. It is seated near a lake of the same name, 70 miles S.W. of Venezuela. Lon. 70. 45 E. Lat. 10. 0 N.

MARACOCK, in botany, a name for one species of the PASSIFLORA, which see.

MARAGAL, a town of Persia, in the province of Aderbeitzan, 42 miles S. of Tauris. Lon. 47. 52 E. Lat. 37. 36 N.

MARAGNAN, a province of S. America, in Brasil, which comprehends a fertile populous island, 112 miles in circumference. The French settled here in 1612, and built a town; but they were soon expelled by the Portuguese. It has a castle, a harbour, and a bishop's see. Lon. 54. 55 W. Lat. 1. 20 S.

MARALDI (James Philip), a learned astronomer and mathematician, was born in 1665, at Perinaldo, in the county of Nice, a place already honoured by the birth of his maternal uncle the celebrated Cassini. Having made a considerable progress in mathematics, at the age of 22, his uncle, who had been a long time settled in France, invited him there, that he might himself cultivate the promising genius of his nephew. Maraldi no sooner applied himself to the contemplation of the heavens, than he conceived the design of forming a catalogue of the fixed stars, the foundation of all the astronomical edifice. In consequence of this design, he applied himself to observe them with the most constant attention; and he became by this means so intimate with them, that on being shewn any one of them, however small, he could immediately tell what constellation it bel nged to, and its place in that constellation. He has been known to discover those small comets, which astronomers often take for the stars of the constellation in which they are seen, for want of knowing precisely what stars the

constellation consists of, when others, on the spot, and with eyes directed equally to the same part of the heavens, could not for a long time see any thing of them.

In 1700 he was employed under Cassini in prolonging the French meridian to the northern extremity of France, and had no small share in completing it. He then set out for Italy, where Clement the XIth invited him to assist at the assemblies of the congregation then sitting in Rome to reform the calendar. Bianchini also availed himself of his assistance to construct the great meridian of the Carthusian church in that city. In 1718, Maraldi, with three other academicians, prolonged the French meridian to the southern extremity of that country. He was admitted a member of the Academy of Sciences of Paris in 1699, in the department of astronomy, and communicated a great multitude of papers, which are printed in their memoirs, in almost every year from 1699 to 1729, and usually several papers in each of the years; for he was indefatigable in his observations of every thing that was curious and useful in the motions and phenomena of the heavenly bodies. As to the catalogue of the fixed stars, it was not quite completed; just as he had placed a mural quadrant on the terras of the observatory, to observe some stars towards the north and the zenith, he fell sick, and died the first of December, 1729.

MARANATHA, a Syriac word, which signifies *the Lord comes*, or *the Lord is come*; namely, to take vengeance; a form of threatening, cursing, or anathematizing used among the Jews. See 1 Corin. xvi. 22.

MARANTA, in botany, a genus of the class monandria, order monogynia. Calyx three-leaved; corol three-cleft; nectary three-parted, the third division bearing the anther on the upper side. Four species.

1. M. arundinacea. Indian arrow-root. Culm branched, herbaceous, leaves ovate, lanceolate, slightly hairy underneath; root fleshy, creeping, knotty; flowers white, terminal, in loose branches; capsule one-seeded. The plant rises about two feet high. A native of the West Indies; and in those islands serves as the common material for starch, which is obtained from the root well beaten first of all in a large mortar to a pulp, which is then dissolved in water, and the solution filtered, when a fine powdery substance will be precipitated, which, on being exsiccated by the sun, is the powder denominated starch: whence this vegetable possesses also the name of starch-plant. The root thus powdered and bleached is also sold in our own country, under the name of Indian arrow-root. A native of the West Indies.

Of the other three species: 2. M. touchas, a native of India and Cochinchina, with a creeping tubercled root and white flowers, has nothing very prominent appertaining to it. 3. M. mallaccensis, of Mallacca, is a doubtful plant, allied to the lostus mallaccensis of Kœnig; and 4. M. comosa, a native of Surinam, stemless, with spiked, comose scape, probably ought to form a new genus.

MARASMUS, (*marasmus*, μαρασμος, from μαραινω, to grow lean.) In medicine. Emaciation. A wasting away of the flesh.

MARATHA, in botany, a genus of the class cryptogamia, order filices. Fructification oval, scattered over the surface of the frond, many-celled, opening longitudinally on the upper side; cells opening in a double row; seeds numerous, ovate, minute. Three species; all exotics.

MARATHON, a village of Attica, 10 miles from Athens, celebrated for the victory which the 10,000 Athenians, and 1000 Platænians, under the command of Miltiades, gained over the Persian army, consisting of 100,000 foot, and 10,000 horse, or, according to Val. Maximus, of 300,000, or, as Justin says, of 600,000, under the command of Datis and Artaphernes, on the 28th of Sept. 490 B.C. In this battle, according to Herodotus, the Athenians lost only 162 men, and the Persians 6300. Justin has raised the loss of the Persians, in this expedition and in the battle, to 200,000 men. It was also in the plains of Marathon that Theseus overcame a celebrated bull, which plundered the neighbouring country.

MARATHROPHYLLUM. (*marathrophyllum*, μαραθροφυλλον, from μαραθον, fennel, and φυλλον, a leaf; so named because its leaves resemble those of the common fennel.) See PEUCEDANUM.

MARATHRUM. (*marathrum*, μαραθρον, from μαραινω, to wither; so called because its stalk and flowers wither in the autumn.) See FŒNICULUM.

MARATHRUM SYLVESTRE. See PEUCEDANUM.

MARATTA. See MARHATTAS.

MARATTI (Carlo), an excellent Italian painter, born at Camerino, in the march of Ancona, in 1625. He became the pupil of Andrea Sacchi, and chiefly applied himself to painting madonnas and female saints. Pope Clement XI. gave him a pension, and conferred on him the order of knighthood. He was also painter in ordinary to Louis XIV. Maratti erected two noble monuments for Raphael and Hannibal, at his own expence, in the Pantheon. How well he maintained the dignity of his profession appears by his answer to a Roman prince, who complaining of the excessive price of his pictures, he told him there was a vast debt due from the world to the famous artists his predecessors, and that he, as their rightful successor, was come to claim those arrears. His abilities in painting were accompanied with many virtues, and particularly with an extensive charity. This great painter died at Rome in 1713, in the 88th year of his age.

MARAUDING, in a military sense, means the act of soldiers, who, without any order, go into the neighbouring houses and villages, when the army is either in camp or garrison, to plunder and destroy, &c. Marauders are a disgrace to the camp, to the military profession, and deserve no better quarter from their officers than they give to poor peasants, &c.

MARAVEDI, a little Spanish copper coin, worth somewhat more than a French denier, or half a farthing English.

MARBLE, in mineralogy. See MARMOR. In the language of the statuary and architect all stones come under the name of marble that are harder than gypsum, occur in considerable masses, and are capable of a good polish. Hence not only many varieties of limestone, but also granite, porphyry, serpentine, and even the fine-grained basalts, are called marble. Among mineralogists, however, the term is used in a more restricted sense, being confined to those varieties of dolomite, swine-stone, and compact, and granularly foliated lime-stone that are capable of receiving a considerable polish. Of these calcareous marbles the most valuable for hardness, durability, and colour, are procured from Italy, from the Greek islands, and from Syria: the ancient Romans, when at their height of civilized luxury, also obtained from Numidia and other districts in Africa some highly esteemed varieties of marble.

The white granularly foliated lime-stone has always been the favourite material of the sculptors of ancient Greece and modern Europe, both on account of its pure colour, its delicate translucence, and its granular texture, which renders it much more easy to work than compact lime-stone. Dolomite possesses similar advantages, and is somewhat softer and of a finer grain: several of the smaller works of the Greek sculptors are of this material. The two great sources whence the statuary marble of Europe has been procured are Paros and Carrara. The Parian marble is the purest, consisting of hardly any thing else than carbonat of lime; hence it is softer, somewhat more transparent, and of a more visibly laminated texture than that of Carrara, which is mingled, often in considerable proportion, with granular quartz.

The most esteemed of the architectural marbles are the following.

1. A deep blue coloured marble, called bardiglio, from Carrara, which appears to differ only in colour from the white statuary marble of the same place.

2. Cipolin marble, which is statuary marble traversed by veins of mica.

3. Lumachelle marble, which is a secondary compact lime-stone of a grey or greyish brown colour, holding shells that still retain their pearly lustre. The fire marble of Bleyberey, in Carinthia, is the most valuable of this variety; the base is a greyish brown compact limestone, in which are implanted shells of a fire colour and beautiful iridescent lustre.

4. Florentine marble, which is a compact very argillaceous lime-stone, of a grey colour, with designs of a yellowish brown, representing architectural ruins.

5. The yellow marbles of Syria, Siena, and Arragon.

6. The green marble known by the names of campan, verde antiche verde di' Corsica, &c. which are mixtures of granularly foliated lime-stone, calcareous spar, and serpentine, with threads of asbestos.

7. A very rich breccia, called brocatelli, containing small fragments of yellow, red, and purple lime-stone, cemented by semitransparent white calcareous spar.

Of the marbles that the British islands produce that of Tiree deserves the first place; and if its colours were not apt to fade, it might rank among the most beautiful even of Italy. The counties of Devonshire and Derbyshire also afford several varieties of considerable beauty, though by no means to be compared with the most esteemed of Italy and Spain.

MARBLES (Arundel). Marbles with a chronicle of the city of Athens inscribed on them (as was supposed) many years before our Saviour's birth; presented to the university of Oxford by Thomas earl of Arundel; whence the name. See ARUNDELIAN MARBLES.

MARBLES (Playing), are mostly imported from Holland; where it is said they are made by breaking the stone alabaster, or other substance, into pieces or chips of a suitable size; these are put into an iron mill which turns by water: there are several partitions with rasps within, cut floatways, not with teeth, which turn constantly round with great swiftness; the friction against the rasps makes them round; and as they are formed, they fall out of different holes, into which size or chance throws them. They are brought from Nuremberg to Rotterdam, down the Rhine, and from thence dispersed over Europe.

MA'RBLE. *a.* 1. Made of marble. (*Waller.*) 2. Variegated, or stained like marble (*Sidney*).

To MA'RBLE. *v. a.* (*marbler*, Fr.) To variegate, or vein like marble (*Boyle*).

MARBLEHEARTED, *a.* (*marble* and *heart.*) Cruel; insensible; hardhearted (*Shak.*)

MARBLED, something veined or clouded, resembling marble. See MARBLING.

MARBLED CHINA-WARE, a name given by many to a species of porcelain or china-ware, which seems to be full of cemented flaws. It is called by the Chinese, who are very fond of it, *tsou tchi*. It is generally plain white, sometimes blue, and has exactly the appearance of a piece of china which had been first broken, and then had all the pieces cemented in their places again, and covered with the original varnish. The manner of preparing it is easy, and might be imitated with us. Instead of the common varnish of the china-ware, which is made of what they call oil of stone and oil of fern mixed together, they cover this with a simple thing made only of a sort of coarse agates, calcined to a white powder, and separated from the grosser parts by means of water, after a long grinding in mortars. When the powder has been thus prepared, it is left moist, or in form of a sort of cream, with the last water that is suffered to remain in it, and this is used as the varnish. Our crystal would serve full as well as those coarse agates, and the method of preparation is perfectly easy. The occasion of the singular appearance of this sort of porcelain is, that the varnish never spreads evenly, but runs into ridges and veins. These often run naturally into a sort of mosaic-work, which can scarce be taken for the effect of chance. If the marbled china be desired blue,

they first give it a general coat of this colour, by dipping the vessel into a blue varnish; and when this is thoroughly dry, they add another coat of this agate-oil.

MARBLING, in general, the painting any thing with veins and clouds, so as to represent those of marble.

Marbling of books or paper is performed thus: dissolve four ounces of gum arabic in two quarts of fair water; then provide several colours mixed with water in pots or shells, and with pencils peculiar to each colour, sprinkle them by way of intermixture upon the gum water, which must be put into a trough, or some broad vessel; then with a stick curl them, or draw them out in streaks, to as much variety as may be done. Having done this, hold your book, or books, close together, and only dip the edges in, on the top of the water and colours, very lightly, which done, take them off, and the plain impression of the colours in mixture will be upon the leaves; doing as well the ends as the front of the book in the like manner, and afterwards glazing the colours.

MARBODUS, or MARBODÆUS, bishop of Rennes in 1096. He wrote De Gemmis, and some sacred poems; also the Life of Magnoboldus, bishop of Angers. He died in 1123.

MARCA (Peter de), a French divine, was born in 1594, in the province of Bearn, and educated among the jesuits. He was for some time counsellor of state, but having defended the liberties of the Gallican church in an elaborate treatise, he was made bishop of Conserans; after which he published a book to prove that St. Peter was the only head of the church, to ingratiate himself with the court of Rome. In 1652 he was nominated to the archbishopric of Toulouse, and the year following distinguished himself in a general assembly of the French clergy against the jansenists. He was afterwards appointed archbishop of Paris, and died in 1662, on the day that the bulls for his promotion arrived. After his death appeared his posthumous works, with prefaces, notes, &c. by M. Baluze.

MARCASITE, in mineralogy. See ARSENICUM, and METALLURGY.

MARCELLIANISM, the doctrines and opinions of the Marcellians, a sect of ancient heretics, towards the close of the second century, so called from Marcellus of Ancyra, their leader, who was accused of reviving the errors of Sabellius. Some, however, are of opinion, that Marcellus was orthodox, and that they were his enemies the Arians who fathered their errors upon him. St. Epiphanius observes, that there was a great deal of dispute with regard to the real tenets of Marcellus; but that, as to his followers, it is evident they did not own the three hypostases: for Marcellus considered the Son and Holy Ghost as two emanations from the divine nature, which, after performing their respective offices, were to return again into the substance of the Father; and this opinion is altogether incompatible with the belief of three distinct persons in the Godhead.

MARCELLINUS (Amianus), a Roman historian, who flourished under Constantius, Julian, and Valens. He wrote a history of Rome, from the reign of Domitian to that of Valens, which is to be valued on account of its veracity. It consisted of thirty-one books, of which only eighteen remain. The best editions are those of Gronovius, folio and 4to. L. Bat. 1693, and of Ernesti, 8vo. Lips. 1773.

MARCELLUS (Marcus Claudius), a famous Roman general, who, after the first Punic war, had the management of an expedition against the Gauls, where he obtained the *spolia opima*, by killing with his own hand Viridomarus the king of the enemy. Soon after he was entrusted to oppose Annibal in Italy, and was the first Roman who obtained some advantage over him. Marcellus, in his third consulship, was sent with a powerful force against Syracuse. He attacked it by sea and land, but his operations proved ineffectual, and the invention of a philosopher (Vid. ARCHIMEDES) baffled all the efforts, and destroyed all the great and stupendous military engines of the Romans, during three successive years. The perseverance of Marcellus at last obtained the victory. After the conquest of Syracuse, Marcellus was called upon to oppose a second time Annibal. He displayed as usual great military talents in his operations against this general, but was not, however, sufficiently vigilant against the snares of his adversary. He imprudently separated himself from his camp, and was killed in an ambuscade in the 60th year of his age, in his fifth consulship, A. U. C. 544. Marcellus claims our commendation for his private as well as his public virtues. (*Virg. Plut.*)—2. One of his descendants, who bore the same name, signalized himself in the civil wars of Cæsar and Pompey, by his firm attachment to the latter. Cicero undertook his defence in an oration which is still extant. —The grandson of Pompey's friend rendered himself popular by his universal benevolence and affability. He was son of Marcellus, by Octavia the sister of Augustus. He married Julia, that emperor's daughter, and was publicly intended as his successor. The suddenness of his death, at an early age, was the cause of much lamentation at Rome, and Virgil procured himself great favours by celebrating the virtues of this amiable prince. (Vid. OCTAVIA.) Marcellus was buried at the public expence. (*Virg. Æn. Suet. in Aug.* &c.)—4. The son of the great Marcellus, who took Syracuse, was caught in the ambuscade which proved fatal to his father, but he forced his way from the enemy and escaped. He received the ashes of his father from the conqueror (*Plut. in Marcell*).

MARCESCENT. (*marcescens*). In botany, withering, shrivelling. Contabescit nec decidit. Decaying without falling off. Applied to the perianth, in the class diadelphia: and to the corol, in campanula, orchis, cucumis, cucurbita, bryonia, &c.

MARCGRAVE, or MARGRAVE, a kind of dignity in Germany, answering to our marquis; (see MARQUIS.) The word is derived from the German Marche, or Marcke, which signifies "a frontier;" and Graffe, "count,

MARDIKERS, or TOPASSES, a mixed breed of Dutch, Portuguese, Indians, and other nations incorporated with the Dutch at Batavia, in the East Indies.

MARE, the female of the horse kind. See the article HORSE. No mares in the world are better suited for breeding from than the English, provided they are properly chosen for the sort of horse intended to be bred. The mare, whatever sort of horse is intended to be raised from her, should be perfectly sound, and as free from all defects as the stallion. The highest spirited mares are the best; and, in general, if there be any natural defect in the mare, it should be remedied in the stallion; and if any in the stallion, it should be remedied in the mare, as much as possible, in order to the having good colts. See the articles BREEDING, DEFECTS, &c.

The particular directions regarding the kinds of horses to be bred are these: if for the manage, the mare should have her head well set on, and her breasts broad; her legs not too long, her eyes bright and sparkling; and her body large enough that the foal may have room. She should be of a good and gentle disposition, and her motions easy and graceful. In a word, the more good qualities the mare has, the better, in general, her colts will prove. See the article COLT.

If the owner would breed for racing, or for hunting, the mare must be chosen lighter, with short back and long sides, her legs must be longer, and the breast not so broad; and with good blood in her veins. If the speed and wind of any particular mare have been tried, and found good, there is the more certainty of a good colt from her; but she should be in full health and vigour at the time, and not above seven years old, or eight at the utmost. The younger the breeders are, the better, in general, the colts will be. A filly covered in her third year will generally produce a good colt in her fourth; and brood mares from an excellent stock will produce to their twentieth or twenty-fifth year. The best season for covering is May and June: and the time of gestation is from eleven to twelve months.

MARESTAIL, in botany. See EQUISETUM.

MA'RESCHAL. *s.* (*mareschal*, French.) A chief commander of an army (*Prior*).

MARENNES, a town of France, in the department of Lower Charente, remarkable for the green-finned oysters found near the coast, and its salt. It is seated near the Atlantic, 32 miles N.W. of Saintes, and 270 S.W. of Paris. Lon. 0. 49 W. Lat. 46. 15 N.

MAREOTIS, a lake in Egypt near Alexandria. Its neighbourhood was famous for wine; though some make the Mareoticum vinum grow in Epirus, or in a certain part of Libya, called also Mareotis, near Egypt.

MARETIMO, an island of Italy, on the W. coast of Sicily. It is 10 miles in circumference, has a castle, with a few farm-houses, and produces much honey. Lon. 12. 35 E. Lat. 38. 5 N.

MARGA. Marl. In mineralogy, a genus of the class earths, order calcareous. Consisting of carbonat of lime, and argil, with generally some oxyd of iron; soft, opake, of a common form, internally earthy, light and miscible with common water by agitation; found in stratified mountains; partly soluble in nitric acid, with effervescence; hardening in the fire and vitrifying in a strong heat. Seven species.

1. M. terrea. Calcareous marl. Earthy marl. Friable, meagre, a little rough to the touch. Four varieties.

α. Argillaceous, lubricous, friable, elastic.
β. Argillaceous, compact, dry, pure with fine particles.
γ. Cretaceous, soiling the fingers.
δ. Arenaceous, crumbling to powder in the air, a little greasy.

Found in almost every country in Europe in strata; colour whitish, yellowish white or yellowish-grey; grows paler in drying: sometimes found mixed with mica, gypsum or sand, and in the latter case is fusible into a transparent glass: spec. grav. from 1,600 to 2,400.

2. M. Nilotica. Egyptian marl. Farinaceous, brownish, cinereous when burnt, mixed with mould. Found in the plains of Egypt usually overflowed by the waters of the Nile, where it is left by deposition after their recess, and is highly fertile.

There is a vitrifying variety found at Upland in Sweden.

3. M. fatiscens. Marly schistus. Very soft, fissile, greyish, crumbling to powder in the air. Found in thicker or thinner strata in Sweden, Germany, and Switzerland, often between calcareous strata: colour yellowish, greenish, blueish, with often a rufous tinge.

4. M. porosa. Marne tophus, or tufa: solid tufa: argillaceous tufa. Indurated, porous, precipitated from waters, breaking into indeterminate fragments. Found in various parts of Britain, Sweden and Germany, at the bottom of waters, particularly those that are stagnant, and becomes reddish when burnt, in proportion to the oxyd of iron it contains; sometimes whitish or grey.

5. M. schistosa. Marl schistus: indurated calcareous marl. Indurated, not crumbling in the air, greyish, of a slaty texture, breaking into discoid fragments. There is a variety that is slaty, crude and green; called in Syst. Nat. schistus viridis, green schistus. Found stratified in various parts of Europe, with frequently particles of mica interspersed, and sometimes the oxyds of metals and fossils.

6. M. bituminosa. Bituminous marl: bituminous marlite: bituminous marl schistus. Schistous copper: corrosive copper. Found in stratified mountains of various parts of Germany, frequently containing the impressions of fishes and marine plants, and often the ores and oxyds of copper; colour greyish, blueish or blackish; the thin plates a little sonorous: spec. gravity from 2,361 to 2,442.

7. M. anonyma. Pyritaceous limestone.—Shining within, hardish, of a dull iron colour. Found near St. Ambroix in France, sometimes so hard as to admit a polish, and strike fire with steel: besides a little schistose earth, sulphur

and quartz, it contains iron, argil and carbonat of lime.

MARGARET (St.), a celebrated virgin, who, as is supposed, received the crown of martyrdom at Antioch in the year 275: the manner of her death is not known. The ancient martyrologists make no mention of her name, and she did not become famous till the 11th century. There is no more foundation for what is said concerning her relics and girdles than for the stories which are told of her life. A festival, however, is still held in honour of her memory on the 20th of July. See Baillet's Lives of the Saints, for that day. "Her actions (says this author) have been so falsified and altered, in the opinion even of Metaphrastus, that the Romish church have not thought proper to insert any of them into their breviary." The Orientals pay reverence to her by the name of Saint Pelagia or Saint Marina, and the western church by that of Saint Gerama or Saint Margaret.

MARGARET of Anjou, queen of England, daughter of René of Anjou, king of Sicily, and wife of Henry VI. Henry duke of Gloucester having opposed this marriage, Margaret spared no pains to ruin that virtuous prince, which she at length accomplished, and he was strangled in prison. In the civil wars that broke out between the houses of Lancaster and York, she displayed an amazonian spirit, and having mustered an army, defeated the duke of York at Wakefield. In her march to London she encountered the earl of Warwick at St. Alban's, who had her husband with him as a prisoner. Margaret immediately attacked him, routed his forces, and set her husband at liberty. But afterwards she was defeated at Tawton, and finding no probability of getting a new army in England, she crossed over to France with her son Edward, to solicit succours from Louis XI. who refused them. She returned again to England. After various hardships, she was made prisoner in 1471, but in 1475 was ransomed by Louis, in return for which she made over to him all her right to the duchies of Anjou, Lorraine, and Bar, and the county of Provence. She died in the parish of Dampierre near Saumur in 1482.

MARGARET, countess of Richmond and Derby, was born at Bletsoe in Bedfordshire in 1441. She married Edmund earl of Richmond, by whom she had an only son, who was afterwards Henry VII. She became a widow in 1546, and afterwards married sir Henry Stafford, on whose death she united herself in marriage to Thomas lord Stanley, who was created earl of Derby in 1485. This noble lord died in 1504. Her ladyship was a great patroness of learning, and learned men, and founded two colleges at Cambridge, Christ's and St. John's. She published a work entitled, The Mirroure of Golde for the sinfull Soule, translated from the French; also the fourth book of Gerson's or Kempis's treatise of the Imitation and following the blessed Life of our Saviour Christ, printed in 1504. She died in 1509.

MARGARET of Valois, queen of Navarre, and sister to Francis I. king of France, was born in 1492, and was daughter of Charles of Orleans, duke of Angoulême. In 1509 she married Charles the last duke of Alençon, who died in 1525. Her next husband was Henry d'Albert king of Navarre, by whom she had Joan d'Albert, mother of Henry IV. Margaret sustained the character of queen in the most exemplary manner, and died in 1549, having embraced the protestant religion. She wrote, 1. Heptameron, or Novels of the Queen of Navarre, printed in quarto, 1560, and several times since. 2. Les Marguerites de la Marguerite des Princesses, which is a miscellany of her productions, consisting of prose and verse.

MARGARETTA, an island near Terra Firma, 40 miles long and 15 broad, discovered by Columbus in 1498. The continual verdure renders it pleasant; but it is not considerable since the Spaniards retired thence to Terra Firma. The present inhabitants are mulattos, and the original natives. It was taken in 1626 by the Dutch, who demolished the castle. Lon. 63. 12 E. Lat. 10. 46 N.

MARGARITA, in natural history. See PEARL and MYA.

MARGARITA. (*margarita*, μαργαριτης, from *margalith*, Rab.) Perla. Unio. The pearl. A small calcareous concretion, of a bright transparent whiteness, found on the inside of the shell concha margaritifera of Linnéus, or mother-of-pearl fish. Pearls were formerly exhibited as antacids in medicine.

MARGARITA, in surgery, a tumour upon the eye resembling a pearl.

MARGARITANIA, in botany, a genus of the class diœcia, order octandria. Calyx four-toothed; petals four. Fem. Styles four or five; very cartilaginous, four or five grained. One species; a native of Surinam.

MARGATE, a seaport town of England, in the county of Kent, situated on the north coast of the isle of Thanet, within a small bay, in the breach of the cliff, where is a gate to the sea, whence its name. In all matters of civil jurisdiction, Margate is subject to the mayor of Dover, whose deputy resides here, and of which town and port it is a member. The principal street is near a mile in length, and built on an easy ascent, by which means the upper part is clean and dry, and the lower end much more so than formerly; a considerable sum of money having been lately expended in drains for that purpose. The harbour is pleasant, but not greatly frequented, for want of a sufficient depth of water to keep vessels of burden afloat, nevertheless great quantities of corn, and all kinds of grain, are shipped here for London. The pier of wood carried out to the eastward, in a circular form, for the security of shipping, is built where nature, by a cove in the cliff, seemed to direct, and is very ancient. Margate has great conveniency for bathing; the shore being level and covered with fine sand, is extremely well adapted for that purpose. On the wharf are several bathing rooms which are large and convenient. Hither the company resort to drink the water, and from thence, in turn, they enter the machines, which are driven out into the sea, often to the distance of two or three hundred yards, under the conduct of careful

guides. Since Margate has been so much frequented by persons of consequence, many considerable additions and improvements have been made to the town. A large square has been lately erected, in which are some very handsome houses, built by persons of fortune for their own use, with several others intended for the reception of the company. Margate is now as well supplied with shops as most other public places, and there are many very reputable tradesmen, in all branches of business. The various articles of trade are mostly furnished by a ready and quick communication with London, by the hoys. They are sloops of 80 or 100 tons burden, of which there are five, and sail alternately. The passage is often made in eight or ten hours, and at other times in two or three days, as the wind and tide happen to suit. The best wind down is W.N.W. and the best up E.S.E. 25 miles N. of Dover, and 72 E. of London. Lon. 1. 28 E. Lat 51. 24 N.

MARGE. MA'RGENT. MA'RGIN. *s.* (*margo*, Latin; *marge*, French.) 1. The border; the brink; the edge; the verge (*Spenser*). 2. The edge of a page left blank (*Hammond*). 3. The edge of a wound or sore (*Sharp*).

MA'RGINAL. *a.* (*marginal*, French.) Placed or written on the margin (*Watts*).

MA'RGINATED. *a.* (*marginatus*, Latin.) Having a margin.

MARGON (William de), a French writer, was a native of Languedoc, and defended the jesuits against the jansenists with so much acrimony, that the court banished him. In 1746 he obtained his recal, on condition of going into a monastery, where he died in 1760. He assisted in writing the Memoirs of Marshal Villars, Memoirs of the Duke of Berwick, and other works.

MARGODES, in mineralogy. See MARMOR.

MARGRAVE. See MARCGRAVE.

MARHATTAS. See MAHRATTAS.

MARIA (St.), an island in the Indian Ocean, five miles E. of Madagascar. It is 27 miles long and five broad, well watered, and surrounded by rocks. The air is extremely moist, for it rains almost every day. It is inhabited by about 600 negroes, but seldom visited by ships passing that way.

MARIA (St.), the most southern island of the Azores, which produces plenty of wheat, and has about 5000 inhabitants.

MARIA (St.), a considerable town of Spain, in Andalusia, with a small castle. It was taken by the English and Dutch in 1702; and is seated on the Guadaleta, at the mouth of which is a tower and a battery, 18 miles N. of Cadiz. Lon. 6. 6 W. Lat. 36. 39 N.

MARIA (St.), a considerable town of Terra Firma Proper, in the audience of Panama, built by the Spaniards after they had discovered the gold mines that are near it, and soon after taken by the English. It is seated at the bottom of the gulf of St. Michael, at the mouth of a river of the same name. Lon. 78. 12 W. Lat. 7. 43 N.

MARIAMNE, the wife of Herod the Great, by whom she had two sons, Alexander and Aristobulus, and two daughters. Herod was very fond of Mariamne, but she had little regard for him, especially after his putting to death her brother Aristobulus. When Herod went to Rome to court the favour of Augustus, he left secret orders with Josephus and Sohemus, to make away both with her and her mother in case that any misfortune should happen to him. Mariamne having got this secret out of Sohemus, upbraided Herod at his return with his inhumanity, for which he put both her and Sohemus to death.

MARIAN ISLANDS. See LADRONES.

MARIANA (John), a Spanish historian, was born at Talavera in Castile in 1537, and entered among the jesuits at the age of 17. He distinguished himself by a famous book, entituled, De Rege et Regis Institutione, in which he justified the assassination of heretical princes. This piece was burnt at Paris by order of parliament, and brought upon his order much odium. His greatest work is, The History of Spain, written first in Latin, but afterwards in Spanish, and universally known. The author brought it down to 1621, but it has been since continued by others. He was the author of several other books, and died at Toledo in 1624.

MARIBONE, or ST. MARY LE BONE, or rather BORNE, from the neighbouring brook, a parish of Middlesex, on the north-west side of London. The manor appears to have belonged anciently to the bishop of London. The houses in this parish are very numerous, comprising several extensive streets and squares, which are every year increasing. The Paddington road from Islington passes through this parish, which gives it communication with the eastern part of London without passing through the streets. Here were three conduits erected about the year 1238, for supplying the city of London with water; but, anno 1703, when it was plentifully served by the New River, the citizens let them out at 700l. a year for 43 years. There were two for receiving its water at the north-east corner of the bridge on the river Tyburn, and over them stood the lord mayor's banqueting-house, to which (the use of coaches being not then known) his lordship and the aldermen used to ride on horseback, as their ladies did in waggons. This banqueting-house, after being many years neglected, was taken down in 1737, and the cisterns arched over.—This village, if it may be called by that name, is joined by new buildings to London. The old church, which was a mean edifice, was pulled down, and a new one erected in 1741. Besides which it has a great number of chapels of every sect and persuasion, and an extensive work-house for the poor.

MA'RICA, in botany, a genus of the class triandria, order monogynia. Corol one-petalled, six-parted, the segments alternately smaller and larger; stigma petal-form, trifid; the segments simple, acute; capsule three-celled, inferior. One species: a bulbous-rooted plant of Guiana, with grass leaves; and white or blue feathers.

MARIDUNUM, the name by which the Romans called Caermarthen.

MARIE-AUX-MINES, a town of France, in the department of the Vosges, divided into two parts by the river Leber. It is famous for its silver mines, and 25 miles N.W. of New Brisach. Lon. 7. 24 E. Lat. 48. 16 N.

MARIENBURG, a town of Upper Saxony, in Misnia, remarkable for its rich silver mines. It is seated among the mountains, on the confines of Bohemia, 28 miles S.S.W. of Dresden. Lon. 13. 35 E. Lat. 50. 49 N.

MARIENBURG, an ancient and strong town of Western Prussia, capital of a palatinate of the same name, with a castle. It is seated on a branch of the Vistula, 30 miles S.W. of Elbing, and 30 S.E. of Dantzic. Lon. 19. 15 E. Lat. 54. 9 N.

MARIENBURG, a town of France, in the department of the North, formerly a strong place, but dismantled by the French, after it was ceded to them by the treaty of the Pyrenees. It is 10 miles S.W. of Charlemont. Lon. 4. 28 E. Lat. 50. 2 N.

MARIENSTADT, a town of Sweden, in W. Gothland, seated on the lake Wenner, 35 miles S.E. of Carlstadt, and 162 S.W. of Stockholm. Lon. 14. 25 E. Lat. 58. 28 N.

MARIENWERDER, a town of Western Prussia, with a castle. The cathedral is the largest church in the kingdom of Prussia, being 320 feet long; and by its strong breast-works seems to have formerly served as a fortress. The palace here is spacious, and built in the old Gothic taste. Marienwerder is seated on the Vistula, 20 miles S.S.W. of Marienburg. Lon. 19. 5 E. Lat. 53. 49 N.

MARIEGALANTE, one of the Leeward Caribbee Islands, subject to the French. It extends 16 miles from N. to S. and four from E. to W.; and along the E. shore are lofty perpendicular rocks, that shelter vast numbers of tropical birds. It is full of hills, and has several large caverns, with many little streams and ponds of fresh water. It is covered with trees, and particularly abounds with tobacco and the wild cinnamon tree. It is 30 miles N. of Dominica, and 40 E. of Guadaloupe. Lon. 61. 11 W. Lat. 15. 52 N.

MARIGOLD, in botany. See CALENDULA.

MARIGOLD (African). See TAGETES.

MARIGOLD (Corn). See CHRYSANTHEMUM.

MARIGOLD (Fig). See MESEMBRYANTHEMUM.

MARIGOLD (French). See TAGETES.

MARIGOLD (Common Sweet).
MARIGOLD (Pot).
MARIGOLD (Wild).
MARIGOLD (Winter). } See ORIGANUM.

MARILA, in botany, a genus of the class polyandria, order monogynia. Calyx five-leaved; petals five; stigma simple; capsule four-celled, many-seeded. One species; a native of the West Indies.

To MA'RINATE. *v. a.* (*mariner*, French.) To salt fish, and then preserve them in oil or vinegar (*King*).

MARI'NE. *a.* (*marinus*, Latin.) Belonging to the sea (*Woodward*).

MARINE, a general name for the navy of a kingdom or state; as also the whole economy of naval affairs; or whatever respects the building, rigging, arming, equipping, navigating, and fighting ships. It comprehends also the government of naval armaments, and the state of all the persons employed therein, whether civil or military. The history of the marine affairs of any one state is a very comprehensive subject, much more that of all nations. Those who would be informed of the maritime affairs of Great Britain, and the figure it has made at sea in all ages, may find abundance of curious matter in Selden's Mare Clausum; and from his time to ours we may trace a series of facts in Lediard's and Burchet's Naval History, but above all in the Lives of the Admirals, by the accurate and judicious Dr. Campbell.

MARINES, or MARINE FORCES, a body of soldiers raised for the sea-service, and trained to fight either in a naval engagement or in an action ashore. The great service of this useful corps was manifested frequently in the course of the war before last, particularly at the siege of Belleisle, where they acquired a great character, although lately raised, and hardly exercised in military discipline. At sea they are incorporated with the ship's crew, of which they make a part; and many of them learn in a short time to be excellent seamen, to which their officers are ordered by the admiralty to encourage them, although no sea officer is to order them to go aloft against their inclination. In a sea-fight their small arms are of very great advantage in scouring the decks of the enemy; and when they have been long enough at sea to stand firm when the ship rocks, they must be infinitely preferable to seamen if the enemy attempts to board, by raising a battalion with their fixed bayonets to oppose them.

The sole direction of the corps of marines is vested in the lords commissioners of the admiralty; and in the admiralty is a distinct apartment for this purpose. The secretary to the admiralty is likewise secretary to the marines, for which he has a salary of 300l. a year; and he has under him several clerks for the management of this department. The number of marines in the British service at this time is between 30 and 40,000

MARINE ACID. See ACID and MURIATIC.

MARINE CHAIR, a machine invented by Mr. Irwin for viewing the satellites of Jupiter at sea, and of course determining the longitude by their eclipses. An account of it is given in the Journal Estranger for March 1760. An account of its accuracy was published the year following by M. de l'Isle, astronomer in the imperial academy of Petersburg; but notwithstanding the encomiums bestowed upon it by this gentleman, it has never come into general use; and therefore we may conclude, that it is much inferior to the inventions of Mr. Harrison for the same purpose.

MARINE SURVEYOR, is the name of a machine contrived by Mr. H. de Saumarez for measuring the way of a ship in the sea. This machine is in the form of the letter Y, and is made of iron or any other metal. At each end

of the lines which constitute the angle or upper part of that letter are two pallets, not much unlike the figure of the log; one of which falls in the same proportion as the other rises. The falling or pendent pallet meeting a resistance from the water, as the ship moves, has by that means a circular motion under water, which is faster or slower according as the vessel moves. This motion is communicated to a dial within the ship, by means of a rope fastened to the tail of the Y, and carried to the dial. The motion being thus communicated to the dial, which has a bell in it, it strikes exactly the number of geometrical paces, miles, or leagues which the ship has run. Thus the ship's distance is attained, and the forces of tides and currents may also be discovered by this instrument: which, however, has been very little used.

MARINE SALT. Sal commune. Sal culinaris. Sal fontium. Sal gemmæ. Sal marinus. Sal fossile. Murias sodæ. New Ch. Nom. Common culinary salt. This salt is more abundant in nature than any other. It is found in prodigious masses in the internal parts of the earth, in Calabria, in Hungary, in Moscovy, and more especially Weilieska, in Poland, near Mount Capax, where the mines are very large, and afford immense quantities of salt. It is also obtained by several artificial means from sea-water. See MURIDAS SODÆ.

MA'RINER. *s.* (from *mare*, Latin.) A seaman; a sailor (*Swift*).

MARINER'S COMPASS. See COMPASS.

MARINO (St.), a town of Italy, in Campagna di Roma, with a castle, 10 miles E. of Rome. Lon. 12.46 E. Lat. 41.54 N.

MARINO (John Baptist), a celebrated Italian poet; born at Naples in 1569. His father, who was an able civilian, obliged him to study the law; at which being disgusted, he left his parents, and retired to the house of the Sieur Manzi, who was a friend to all persons of wit. He at length became secretary to Matthew of Capua, great admiral of the kingdom of Naples, and contracted a friendship with Tasso. A short time after he went to Rome, and entered into the service of cardinal Aldobrandini, nephew to pope Clement VIII. who took him with him to Savoy. Marino was in great favour with the court of Turin; but afterwards created himself many enemies there, the most furious of whom was the poet Gaspard Murtola, who, attempting to shoot him with a pistol, wounded one of the duke of Savoy's favourites. Marino being obliged to leave Turin, went to Paris at the desire of queen Mary de Medicis, and published there his poem on Adonis. He afterwards went to Rome, where he was made prince of the academy of the humoristi; from thence to Naples, where he died while he was preparing to return home. He had a very lively imagination, but little judgment; and, giving way to the points and conceits then in vogue, his authority, far from correcting the false taste of the Italians, served rather to keep it farther from reformation. His works, which are numerous, have been often printed.

MARIONIS, the Roman name for Hamburg.

MARIOTTE (Edme), an eminent French philosopher and mathematician, was born at Dijon, and admitted a member of the Academy of Sciences of Paris in 1666. His works however are better known than his life. He was a good mathematician, and the first French philosopher who applied much to experimental physics. The law of the shock or collision of bodies, the theory of the pressure and motion of fluids, the nature of vision, and of the air, particularly engaged his attention. He carried into his philosophical researches that spirit of scrutiny and investigation so necessary to those who would make any considerable progress in it. He died in 1684.

He communicated a number of curious and valuable papers to the Academy of Sciences, which were printed in the collection of their Memoirs dated 1666, viz. from volume 1 to volume 10. And all his works were collected into two volumes quarto, and printed at Leyden in 1717.

MARJORAM, in botany. See ORIGANUM.

MA'RISH. *s.* (*marais*, French.) A bog; a fen; a swamp; watery ground (*Sandys*).

MA'RISH. *a.* Moorish; fenny; boggy; swampy (*Bacon*).

MARITAGIUM, in the feudal customs (as contradistinguished from *matrimonium*) denoted the power which the lord or guardian in chivalry had of disposing of his infant ward in matrimony.

MA'RITAL. *a.* (*maritus*, Latin.) Pertaining to a husband (*Ayliffe*).

MA'RITATED. *a.* (from *maritus*, Latin.) Having a husband.

MARI'TIMAL. MA'RITIME. *a.* (*maritimus*, Latin; *maritime*, French.) 1. Performed on the sea; marine (*Raleigh*). 2. Relating to the sea: naval (*Wotton*). 3. Bordering on the sea (*Milton*).

MARIUS (C.), a celebrated Roman, who, from a peasant, became one of the most powerful and cruel tyrants during the consular government. He was born at Arpinum, of obscure parents. He forsook the plough for the camp, and signalized himself under Scipio at the siege of Numantia. By his intrigues at Rome, while he exercised the inferior offices of the state, he rendered himself known. He passed into Africa as lieutenant to the consul Metellus against Jugurtha, and, after he had there ingratiated himself with the soldiers, he returned to Rome, and canvassed for the consulship. He was elected, and appointed to finish the war against Jugurtha, who was defeated, and afterwards betrayed into the hands of the Romans by Bocchus. No sooner was Jugurtha conquered, than the provinces of Rome were suddenly invaded by an army of 300,000 barbarians, and Marius was again elected consul, and sent against the Teutones. The war was prolonged, and Marius was a third and fourth time invested with the consulship. At last two engagements were fought, and not less than 200,000 of the barbarian forces of the Ambrones and Teutones were slain in the field of battle, and 90,000 made prisoners. The

following year a total overthrow of the Cimbri took place, in which 140,000 were slaughtered by the Romans, and 60,000 taken prisoners. Marius, with his colleague Catullus, then entered Rome in triumph He was elected consul a sixth time, when they began to raise seditions, and to oppose the power of Sylla. This was the cause and the foundation of a civil war Sylla, who was prosecuting the Mithridatic war, and who had refused to deliver up the command of the army, advanced to Rome, and Marius was obliged to save his life by flight. He endeavoured to effect his escape to Africa, but was, in consequence of the wind not proving favourable, obliged to take shelter in a marsh on the coasts of Campania. Here he was discovered, and violently dragged to Minturnæ. Sylla passed sentence of immediate death on him. A Gaul was commanded to cut off his head, but the stern countenance of Marius disarmed the courage of the executioner, and, when he heard the exclamation of *Tune, homo, audes occidere Caium Marium*, the dagger dropt from his hand. Such an uncommon adventure moved the compassion of the inhabitants. They released Marius, and favoured hise scape to Africa, where he resided for some time. Having soon after learned that Cinna had embraced his cause at Rome, he set sail to assist his friend, only at the head of a thousand men. His army, however, was soon increased, and he entered Rome like a conqueror. His enemies were inhumanly sacrificed to his fury, and Rome was filled with blood. When Marius and Cinna had sufficiently gratified their resentment, they made themselves consuls; but Marius, already worn out with old age and infirmities, died in the 70th year of his age, sixteen days after he had been honoured with the consular dignity for the seventh time, B. C. 86. Such was the end of Marius, who rendered himself conspicuous by his victories, and by his cruelty.—2. Caius, the son of the great Marius, was as cruel as his father, and shared his good and his adverse fortune.—3. M. Aurelius, a native of Gaul, who, from the mean employment of a blacksmith, became one of the generals of Gallienus, and at last caused himself to be saluted emperor. Three days after this elevation, a man who had shared his poverty without partaking of his more prosperous fortune publicly assassinated him.—4. Maximus, a Latin writer, who published an account of the Roman emperors from Trajan to Alexander, now lost.

MARIVAUX (Peter Carlet de), a French writer in the dramatic way and in romance, was born of a good family at Paris in 1688. A fine understanding, well improved by education, distinguished him early. His first object was the theatre, where he met with the highest success in comic productions; and these, with the merit of his other works, procured him a place in the French academy. The great characteristic of both his comedies and romance was, to convey an useful moral under the veil of wit and sentiment: "My only object (says he) is to make men more just and more humane;" and he was as amiable in his life and conversation as he was in his writings. He died at Paris in 1763, aged 75. His works consist of, 1. Pieces de Theatre, 4 vols. 12mo. 2. Homere travesti, 12mo.; which is not supposed to have done much honour to his taste. 3. Le Spectateur François, 2 vols. 12mo. 4. Le Philosophe Indigent, 12mo. 5. Vie de Marianne, 2 vols. 12mo; one of the best romances in the French language. 6. Le Paysan Parvenu, 12mo. 7. Pharsamon; inferior to the former.

MARK (St.), was by birth a Jew, and descended of the tribe of Levi. He was converted by some of the apostles, probably by St. Peter; to whom he was a constant companion in all his travels, supplying the place of an amanuensis and interpreter. He was by St. Peter sent into Egypt, fixing his chief residence at Alexandria, and the places thereabout: where he was so successful in his ministry, that he converted multitudes both of men and women. He afterwards removed westward, towards the parts of Libya, going through the countries of Marmorica, Pentapolis, and others thereabouts; where, notwithstanding the barbarity and idolatry of the inhabitants, he planted the gospel. Upon his return to Alexandria, he ordered the affairs of that church, and there suffered martyrdom in the following manner: about Easter, at the time the solemnities of Serapis were celebrated, the idolatrous people, being excited to vindicate the honour of their deity, broke in upon St. Mark, while he was performing divine service, and, binding him with cords, dragged him through the streets, and thrust him into prison, where in the night he had the comfort of a divine vision. Next day the enraged multitude used him in the same manner, till, his spirits failing, he expired under their hand. Some add, that they burnt his body, and that the Christians decently interred his bones and ashes near the place where he used to preach. This happened in the year of Christ 68. Some writers assert, that the remains of St. Mark were afterwards, with great pomp, translated from Alexandria to Venice. However, he is the tutelar saint and patron of that republic, and has a very rich and stately church erected to his memory. This apostle is author of one of the four gospels inscribed with his name. See the following article.

MARK's GOSPEL (St.), a canonical book of the New Testament, being one of the four gospels. St Mark wrote his gospel at Rome, where he accompanied St. Peter, in the year of Christ 64 or 65. Many of the most ancient writers assert, that St. Mark was no more than an amanuensis or interpreter to St. Peter, who dictated this gospel to him; others affirm that he wrote it after St. Peter's death. It is probable that it was not composed long before Peter's death, and that it was not published, or did not become generally known, till after the death of Peter and Paul. This gospel appears, from the accounts given of it by the ancients, to contain the substance of Peter's preaching: and the gospel itself affords evidences of its being writ according to that apostle's discourses, or according to information

and directions given by him to this evangelist. Many circumstances tending to Peter's honour are not mentioned in this gospel: however there are many things that occur in this gospel, which are omitted by the other evangelists; and this fact proves, that Mark was not an epitomiser of Matthew, as some have supposed, nor of any other author. The learned have been also divided as to the language this gospel was wrote in, some affirming it was composed in Greek, which is the more general and probable opinion, others in Latin. Several of the ancient heretics received only the gospel of St. Mark: others, among the Catholics, rejected the twelve last verses of this gospel. But Dr. Lardner refers those who doubt the genuineness of this part of the gospel, for satisfaction to Dr. Mill, and to the observations of Grotius, at the beginning of that chapter, and to Beza upon the ninth verse; and for explaining those twelve verses, and reconciling them with the other evangelists, he refers to Grotius and other commentators. Lardner's Cred. vol. xv. p. 209.

That St. Mark wrote his Gospel in Rome, and for the use of the Romans, is the reason why he has omitted many particulars in the life of Christ which are related by St. Matthew and St. Luke. The genealogy, for instance, though interesting to the Jews, was not so to the Romans: and the same may be said of Christ's nativity at Bethlehem, a name well known to the Jews, but probably unknown to the Romans. His total omission of Christ's admirable sermon on the mount, which St. Matthew has given at full length, and St. Luke in short extracts, appears at first sight to be rather extraordinary. But we must recollect that this sermon was in fact polemical, and immediately directed against the false morality of the Pharisees. To understand this sermon, therefore, it is absolutely necessary to have a previous knowledge of the Pharisaic doctrines: but these doctrines were unknown to the Romans. The unlearned are not only incapable of comprehending this discourse, but are in danger, without the assistance of a learned interpreter, of totally perverting its meaning. It is a known fact, that very erroneous moral doctrines have been deduced from it, and that these doctrines have been applied as objections to the Christian religion. It has been asserted, that Christ totally prohibited the administration of an oath, the repulse of violence, an appeal to a magistrate, or self-defence. For these reasons, St. Peter himself would hardly have delivered this discourse to the Romans: and for these reasons St. Mark, who probably was assisted by Peter, passed it over in silence. The same motive induced him to give in only a few words, ch. xii. 38—40. another discourse which Christ directed to the Pharisees, and which St. Matthew has delivered at full length.

MARK THE EVANGELIST'S DAY (St.), a festival observed by some Christians on the 25th of April.

MARK. *s.* (*marc*, Welsh; *mercke*, Dutch.) 1. A token by which any thing is known (*Spenser*). 2. A stamp; an impression (*Addison*). 3. A proof; an evidence (*Arbuthnot*). 4. Notice taken (*Shakspeare*). 5. Conveniency of notice (*Carew*). 6. Any thing at which a missile weapon is directed (*Davies*). 7. The evidence of a horse's age (*Bacon*). 8. (*marque*, French.) Licence of reprisals. 9. (*marc*, Fr.) A sum of thirteen shillings and fourpence (*Camden*). 10. A character made by those who cannot write their names (*Dryden*).

To MARK. *v. a.* (*merken*, Dutch; *mearcan*, Saxon.) 1. To impress with a token, or evidence (*Shakspeare*). 2. To notify as by a mark (*Decay of Piety*). 3. To note; to take notice of (*Romans*). 4. To heed; to regard as valid (*Smith*).

To MARK. *v. n.* To note; to take notice (*Dr.*).

MARK! a term used by sportsmen, particularly in covert shooting, where they are necessarily separated from each other; when one of the party having sprung a pheasant, or flushed a cock, (at which he either did not get a shot, or missed his aim) vociferates the signal, *mark!* in a hope his companion may get a shot, or mark the spot near where he alights, to insure a better chanse of his recovery. It is also used in partridge shooting, where hedges or hedgerows interrupt the sight, or divide the parties.

MARK. In stable language a horse marks, when he shews his age by a black spot, like the bud or eye of a bean, which appears, at about five and a half, in the cavity of the cornerteeth, and is gone when he is eight years old: then he ceases to mark, and they say he has rased. See the articles AGE, TEETH, and RASE.

Gibson says, " with regard to the marks of horses, arising from their colour, some have reckoned them to be lucky or unlucky, as they happened to be this or that way marked.—Others have even been so curious as to lay much stress upon them, and to denote all the good or ill qualities of a horse from his marks: but however this may be, certain it is, that a horse always looks the more beautiful for being well marked; and a horse without marks always has a deadness in his aspect.

" A star is the most common of all marks, and where that is wanting, it is often supplied with an artificial one. When the white descends pretty broad toward the nose, it is called a blaze; when it descends into a smaller line, it is called a snip; and when most of a horse's face is white, he is then said to be bald. All these marks are beautiful when they are not in extremes, for a very large star is not reckoned so beautiful as one that is of a moderate size; neither is that baldness that spreads over a horse's whole face and cheeks any way becoming, as it gives him the look of an ox; and such horses are often plain-headed. When the white of a horse's face is divided in the middle, or in any other part, or when a blaze or snip runs awry to one side, it looks somewhat disagreeable, though perhaps it may be no diminution to a horse's goodness. Some black horses have their stars or blazes fringed round with a mixture of black hairs, which looks very well, only such horses are apt soon to grow

grey-faced, and look old; as are some of the browns. But when the bays and sorrels have their stars or blazes fringed, it is generally with their own colour, or lighter, and seldom has that effect.

"As to the white marks upon the feet and legs of horses, they usually correspond with the marks upon their faces. Bald horses have generally a good deal of white about their legs, and often all four are white, which in them is not unbecoming. Horses with large blazes have often all their four feet white also; but a horse that has no marks on his face, or but a small one, never looks well with white legs, especially when the white rises above the fetlock: on the other hand, a bald horse, or any that has a blaze, without any of the feet white, is but ill marked; and therefore a horse always looks best when there is this correspondence and agreement in the marks: a horse that has his near-feet both before and behind white, and his off-feet without any white, is but indifferently marked. The same where the marks are only on the off-feet, without any white on the near-feet.

"Some dislike horses for being traversed, or cross-marked, viz. the near-foot before, and the off-foot behind, white; or on the contrary, when the off-foot before, and the near-foot behind, are only white. Those are usually judged to be the best marked that have only the near-foot behind white, or both feet behind white; or where the near-foot before, and both the hind-feet, are white; especially when at the same time a horse has a large radiated star, or small blaze, on his face. When the white about the feet is indented with black, or any other colour, towards the coronet, these feet are thought to be generally good; and when the coronet is spotted like ermine, the mark is so much the better: but where a horse's pasterns, hoofs, and all his four legs, are white, especially when the white rises above the knees or hocks, it looks ugly; and a horse thus marked has too much of the pye-bald, consequently seldom fit for a gentleman's use.

"The feather is another sort of distinction, which we often observe, especially on stone-horses; and such geldings as have short hair, and are finely coated. Some are of a round figure, and some long and narrow, in the true penniform shape, or like an ear of barley. The round are often on the forehead, sometimes on the breast and shoulders, and look like embroidery. Those on the neck lie immediately under the mane, and run down towards the withers. When the feather happens on both sides the neck, the mark is reckoned exceedingly good and beautiful. Sometimes feathers run down the fore-arms, and sometimes on the thigh, and towards the dock; and they may be observed on several other parts of a horse; but, wherever they happen to be, they are almost always reckoned signs of goodness; and some of them are exceedingly beautiful." See the article FEATHER.

MARK (St.), a sea-port on the W. side of St. Domingo. The houses are built of freestone, which is abundant in the neighbouring country. It was taken by the English and royalists in 1794, and is 45 miles N.N.W. of Port-au-Prince. Lon. 72. 40 W. Lat. 19. 20 N.

MA'RKER. *s.* (from *mark.*) 1. One that puts a mark on any thing. 2. One that notes, or takes notes.

MA'RKET. *s.* (anciently written *mercat*, of *mercatus*, Latin.) 1. A public time, and appointed place, of buying and selling (*Spenser*). 2. Purchase and sale (*Temple*). 3. Rate; price (*marché*, French.) (*Dryden*).

To MA'RKET. *v. n.* To deal at a market; to buy or sell; to make bargains.

MA'RKET (Court of the Clerk of the), is incident to every fair and market in the kingdom, to punish misdemeanors therein; and a court of *pie poudre* is to determine all disputes relating to private or civil property. The object of this jurisdiction (see stat. 17. Car. II. cap. 19. 22 Car. II. cap. 8. 23 Car. II. cap. 12.) is principally the cognizance of weights and measures, to try whether they be according to the true standard thereof or no: which standard was anciently committed to the custody of the bishop, who appointed some clerk under him to inspect the abuse of them more narrowly; and hence this officer, though now usually a layman, is called the clerk of the market. If they be not according to the standard, then, beside the punishment of the party by fine, the weights and measures themselves ought to be burnt. This is the lowest court of criminal jurisdiction in the kingdom.

MA'RKET-BELL. *s.* The bell to give notice that trade may begin in the market (*Shak*).

MA'RKET-CROSS. *s.* A cross set up where the market is held (*Shakspeare*).

MA'RKET-DAY. *s.* The day on which things are publicly bought and sold (*Addison*).

MA'RKET-FOLKS. *s.* People that come to the market (*Shakspeare*).

MA'RKET-MAN. *s.* One who goes to the market to sell or buy (*Swift*).

MA'RKET-PLACE. *s.* Place where the market is held (*Sidney*).

MA'RKET-PRICE. MA'RKET-RATE. *s.* The price at which any thing is currently sold (*Locke*).

MA'RKET-TOWN. *s.* A town that has the privilege of a stated market; not a village (*Gay*).

MA'RKETABLE. *a.* (from *market.*) 1. Such as may be sold; such for which a buyer may be found (*Shakspeare*). 2. Current in the market (*Decay of Piety*).

MA'RKET RASEN. See RASEN.

MARKHAM (Gervase), an English author, was the son of Robert Markham, of Gotham, Esq. in Nottinghamshire, and bore a captain's commission under Charles I. in the civil wars. He was esteemed both a good soldier and a good scholar. He was particularly master of the French, Italian, and Spanish. He wrote, 1. The tragedy of Herod and Antipater, which was printed in 1622. 2. Many volumes upon husbandry and horsemanship. 3. A piece on the art of fowling. 4. The soldier's accidence and grammar,

MARKLAND (Jeremiah), one of the most learned scholars and penetrating critics of his

age, was born in 1692, and received his education in Christ's hospital. He became first publicly known by his Epistola Critica, addressed to bishop Hare. In this he gave many proofs of extensive erudition and critical sagacity. He afterwards published an edition of Statius, and some plays of Euripides; and assisted Dr. Taylor in his editions of Lysias and Demosthenes, by the notes which he communicated to him. He has also very happily elucidated some passages in the New Testament, which may be found in Mr. Bowyer's edition of it; and was author of a very valuable volume of remarks on the epistles of Cicero to Brutus, and of an excellent little treatise under the title of Quæstio Grammatica. He died in 1775, at Milton, near Dorking in Surry; and was a man not more valued for his universal reading than beloved for the excellency of his heart and primitive simplicity of manners.

MA'RKMAN. MA'RKSMAN. *s.* (*mark* and *man.*) A man skilful to hit a mark (*Shak.*)

To MARL. *v. a.* (from the noun.) To manure with marle (*Child*).

To MARL. *v. a.* (from *marline.*) To fasten the sails with marline (*Ainsworth*).

MARLE, in agriculture, a kind of calcareous earth, which is often and advantageously employed as a manure. It is found in various parts of Britain, and generally lies at the bottom of low bogs.

Marle is divided by farmers into three species; calcareous, argillaceous, and siliceous or sandy; all of which are composed of chalk and clay, so as to crumble with greater or less facility, on being exposed to the atmosphere. They are of a soft, unctous nature, and dissolve speedily after rain; when dry, they slacken in the same manner as lime, and are at length converted into a very fine powder. Their quality varies according to the soil under which they are deposited: the Norfolk marle is held in the greatest esteem; but the most valuable is that found near the sea, or large rivers.

1. Calcareous marle is, in general, of a yellowish-white or yellowish-grey colour, but in some places of a brown or red cast. It is commonly discovered a few feet beneath the surface of the soil, and on the sides of hills, or on the banks of rivers flowing through calcareous countries. This species of marle is mostly of a loose texture; and, though sometimes moderately coherent, yet it seldom possesses a stony hardness, in which state it is called stone-marle. When it is so thin as to be called paper-marle, it is frequently mixed with shells; on which account it is called shell-marle, and is reputed to be the best sort. It effervesces with acids: when pulverized, it feels dry between the fingers; and, if immersed in water, it readily crumbles to pieces, but does not form a viscid mass.

2. Argillaceous marle is of a grey, brown, or reddish-brown colour; being harder, and more unctuous, than the former species, and adhering to the tongue. It effervesces with aqua fortis, or spirit of salt, but not with vinegar: in water, it dissolves more slowly; and, if it be exposed either to air or moisture, it does not moulder so quickly as the calcareous kind.

3. Siliceous or sandy marle contains a greater proportion of sand than of chalk or clay. This species is of a brownish-grey or lead colour; it is, in general, friable and flaky, but sometimes forms very hard lumps. It effervesces with acids, but neither dissolves in water, nor moulders so speedily as either of the two former kinds. Marle affords an excellent manure for sandy, dry, gravelly, or light lands of any kind; it likewise produces very beneficial effects on mossy and clayey soils; provided a due proportion be applied, and afterwards perfectly dissolved.

The quantity necessary to be used varies according to the nature of the soil; but the utmost caution is requisite; because, if too large a portion be scattered on the land, it cannot be easily removed; and, if too little be employed, the deficiency may be readily supplied. On sandy, gravelly, or light soils, it will be advisable to spread as much as will form a thick coat, in order to bind and stiffen the ground. But, of whatever nature the land may be, the most judicious cultivators recommend such a portion to be laid on it as will form a thin coat over the whole surface.

As marle affords so valuable a manure, it will be useful to point out a few characteristics, by which it may be distinguished from different substances that resemble it. For this purpose, a small mass or lump should be exposed to the air: if genuine, it will, in a short time, by the action of the dews, nitre, &c. crumble into small pieces; and there will likewise appear a hoary or whitish congelation on the side accessible to the rays of the sun.—Another method consists in reducing the marle, when dry, to small particles, which are to be thrown into a coal-fire; where, if it be native or pure, it will crackle in a manner similar to salt. But the most certain criterion is, to break a small piece of dry marle into a glass of pure water; in which, if the substance be of the genuine kind, it will speedily dissolve; forming a soft, almost impalpable paste, and throwing up many bubbles or sparkles to the surface of the water. The experiment may be repeated with vinegar, in which fluid the effervescence will be considerably stronger: in both cases, however, it will be necessary to keep the glass steady, as otherwise, if it be agitated, the intestine motion cannot be distinctly observed.

A good artificial marle may be prepared, by mixing equal quantities of pure clay and lime, in alternate layers, so as to form a heap, which should be exposed to the winter frost: this compound is well calculated for light lands; but, if the soil be strong and heavy, it will be necessary to substitute loam and sand for the clay. Such compositions may be usefully employed, where marle is not easily procured.

MARLE, in mineralogy. A mixture of carbonat of lime and clay, in which the carbonat considerably exceeds the other ingredient, is called marle. Its structure is earthy. Opaque, sometimes in powder. Specific gravity from

1.6 to 2.877. Colour usually grey, often tinged with other colours. Effervesces with acids. Some marles crumble into powder when exposed to the air; others retain their hardness for many years. Marles may be divided into two varieties: 1. Those which contain more silica than alumina. 2. Those which contain more alumina than silica. Mr. Kirwan has called the first of these siliceous, the second argillaceous marles. Attention should be paid to this distinction when marles are used as a manure.

MARLE (Bituminous), is found in different parts of Germany. Colour greyish or brownish-black. Found massive. Shistose. Plates flat or waved. Opaque. Feels soft. Easily broken. Moderately heavy. Effervesces with acids. Burns before the blowpipe, leaving black scoriæ.

MARLBOROUGH, a town of Wiltshire, in England, situated near the source of the Kennet, at the foot of a chalky hill, 75 miles from London. It has its name from its chalky soil, which was formerly called marle. It was a Roman station. In the year 1627, a parliament was held in the castle here, which made those laws called Marlborough statutes. There are still some small remains of its walls and ditch. The town, which is an ancient borough by prescription, sends two members to parliament. It is governed by a mayor, two justices, twelve aldermen, twenty-four burgesses, a town clerk, two bailiffs, twelve serjeants at mace, &c. It consists chiefly of one broad street, with piazzas all along one side of it, two parish churches, and several commodious inns, it being the grand thoroughfare from London to Bath and Bristol. To the south are some relics of a priory, particularly the Gatehouse; and the site of a Roman Castrum, the foundations of which have been discovered there, with Roman coins. The ditch is still in some parts twenty feet wide; and towards the river, without the garden walls, one angle of the Castrum is very visible, with the rampart and ditch entire. The mount at the west end of the town, which was the keep or main-guard of the castle, is converted into a pretty spiral walk; at the top of which is an octagon summer-house. This town has often suffered by fire, particularly in 1690, whereupon the parliament passed an act to prevent its houses from being thatched. —The markets here are Wednesdays and Saturdays; and it has five fairs. Lon. 1. 25 W. Lat. 51. 28 N.

MARLBOROUGH (Fort), an English factory on the W. coast of the island of Sumatra, three miles E. of Bencoolen, and 300 N.W. of Batavia. Lon. 102. 9 E. Lat. 3. 49 N.

MARLI, a village of France, between Versailles and St. Germain, near a forest of the same name. This place is 10 miles N.W. of Paris. It is celebrated for its magnificent palace, and for its curious machine on the Seine, by which the water is raised to supply the palace.

Descriptions of this machine are given in Hutton's translation of Ozanam's Recreations, vol. ii. p. 149; Gregory's Mechanics, vol. ii. p. 244; and Montucla Histoire des Mathematiques, tome iii. p. 745.

MA'RLINE. *s.* (meapn, *Skinner*.) Long wreaths of untwisted hemp dipped in pitch, with which cables are guarded (*Dryden*).

MA'RLINESPIKE. *s.* a small piece of iron for fastening ropes together (*Bailey*).

MA'RLITE (Bituminous). See MARGA.

MARLOW, or GREAT MARLOW, a town of England, in the county of Buckingham, situated on the side of the river Thames, under the Chiltern hills, with a weekly market on Saturday. It is a borough town, and sends two members to the British parliament. The chief manufacture is making lace and paper. The establishment of the junior department of the Royal Military College is now at this place, the senior department being at High Wycombe. Marlow is 17 miles S. of Aylesbury, and 31 W. of London. Lon. 0. 45 W. Lat. 51. 35 N.

MA'RLPIT. *s.* (*marl* and *pit*.) Pit out of which marl is dug (*Woodward*).

MA'RLY. *a.* (from *marl*.) Abounding with marl (*Mortimer*).

MARLY TUFA, in mineralogy. See TOPHUS.

MA'RMALADE. MA'RMALET. *s.* (*marmelade*, French.) The pulp of quinces boiled into a consistence with sugar (*Quincy*).

MA'RMARIDÆ, the inhabitants of that part of Libya which is between Cyrene and Egypt.

MARMOR. Marble. In mineralogy, a genus of the class earths, order calcareous. Consisting of carbonat of lime, carbonic acid gass and water; hardish, meagre to the touch, of a common form, lightish, composing whole mountains, or the greater part of them, or in detached pieces; burning into quick-lime, soluble for the most part in acids with effervescence. Fourteen species:

1. M. hammites. Ketton-stone. Compact limestone. Oolite. Pisolite. Opaque, without lustre, compact, consisting of accreted round granulations. Three other varieties.

β. Oolite: with the globules as large as the spawn of a fish.

γ. Cenchrite: with the globules as large as a millet-seed.

δ. Meconite: with the globules as large as the seeds of a poppy.

Found in stratified mountains in various parts of Britain, in Saxony, Brunswick, France, and Switzerland, always in large masses, with rarely the remains of animal substances: colour various; the granulations easily detached, and in small pieces may be crumbled between the fingers. Bath-stone and Portland-stone are varieties of this species.

2. M. granulare. Crude marble: foliated and granular lime-stone; nearly opake, lamellar, shining internally, hardish, spontaneously falling into granulations, not admitting a polish. Found in vast beds or strata in many mountains of Europe, constituting their principal parts; and never containing the vestiges of living bodies; granulations of different sizes; colour various; fracture foliated; always straight; is used for building, mending roads,

burning into lime; and as a flux for iron-stone.

3. M. micans. Parian, Paros, or Carrara marble: granular lime-stone. Diaphonous, white, lamellar, shining internally, hardish, spontaneously falling into finer granulations, receiving a polish. It has many varieties.

Found in ancient primitive mountains in vast strata; and with rarely vestiges of animal bodies, in Finland, Saxony, Sweden, Bohemia, near Carrara, in the islands Paros and Antiparos, and most mountainous countries; and is frequently the material of ancient buildings: sometimes contains a portion of quartz, so that it effervesces slowly with acids, and strikes fire with steel.

4. M. phosphoreum. Phosphorescent marble. Compact, diaphonous, snowy, emitting light in the dark when rubbed together. Found in primitive strata in the mountains Vesuvius and Ottajano, and nearly dissolves in nitric acid with a strong effervescence: not only when rubbed together in the dark, but if thrown in powder upon heated iron, it emits a phosphorescent light.

5. M. dolomæi. Dolomite. Effervescing slowly with acids, covering itself with a vitreous coating in the fire. Found in the Tyrolese mountains with hardly any lustre or transparency, and breaking into convex fragments; does not moulder by exposure to the atmospherical air:

It contains

Carbonat of lime	-	4.429
Alumina	- -	0.080
Magnesia	- -	1.4
Iron	- - -	0.074
Carbonic acid gass	-	4.61
		10.99

6. M. elasticum. Elastic marble. Elastic, yellowish-white, emitting a phosphorescent light when thrown on red-hot iron. Found on Mount Gothard in Switzerland, in large masses: surface rough and uneven; slightly flexible and evidently elastic when its length exceeds eleven or twelve times its thickness, effervesces and dissolves very slow with acids.

7. M. squammosum. Schuphichte kalk stein. *Nose orth. Br. Sieb.* Scaly limestone. Granular, compact, scaly. Found in Grapenburg, Finland, and Sweden, constituting the principal part of simple mountains, and containing no vestige of living bodies; colour white or reddish yellow; produces an indifferent quick-lime.

8. M. porosum. Filtering-stone. Perforated with pores, without lustre, opaque, not receiving a polish. Four varieties.

α. Perforated with pores, distilling water. Found in the quarries of Rudersdorf in Germany.

β. Spongy. Found in the Pyrenees, and province of Bearne.

γ. Hollow, and appearing rotten. Found near Idria, in Carniola.

δ. Cellular. Found in Alsace and the vast mountains of Bohemia; the pores are formed by pyrite formerly imbedded in it, but which has mouldered away and been washed out.

9. M. margodes. Margodes: fissile marble; calcareous marl; carbonat of lime and clay. Compact, without lustre, subopaque, not receiving a polish, with the fragments convex. Found in stratarial mountains of Bavaria, Frankfort, Sweden; mixed with a greater or less proportion of clay, and often marked with diaphonous veins in the form of shrubs; with frequently the vestiges of fishes and crabs, rarely shells or such animals as inhabit salt water; colour yellowish or reddish-white.

10. M. stratarium. Stratified marble: Alwarster. *It. Oel.* Mixed with clay, in water falling into powder, crackling in the fire, consisting of horizontal strata. Found in Oeland, Scania and the mountain Kinnekalle in Sweden, breaking into horizontal and perpendicular strata, and abounding in petrifactions: the upper strata are much harder than the lower.

11. M. florentinum. Florentine marble; pictured marble. Mixed with argil, opaque, compact, receiving a polish, curiously depicted. Found in Italy and Mount Sinai, yellowish-grey, with generally brown pictured marks of various forms.

12. M. nobile. Proper marble: soluble marble: carbonat of lime. Subopaque, compact, of a splintery fracture, receiving a high polish, and of a fine colour. Many varieties, as follow.

A. of one uniform colour.

α. Rufous. Numidian.
β. Flesh-colour.
γ. Red.
δ. Cinnamon. Marmo-canello.
ε. Yellow. Phengites.
ζ. Pale-yellow. Polombino antico.
η. Grey. Bardillo. Venetian.
θ. Blue. Of Chios and Narbon.
ι. Green. Verdello.
κ. Livid. Pardalian.

B. Variegated.

α. With bands.
β. With striæ.
γ. With lines. Marmo scritto
δ. With veins.
ε. With intermingled colours.
ζ. With spotted. Brocatello.
η. With ocellated. Orchio dipavone.
θ. With dotted.
ι. With powdered. Marmo polveroso.
κ. With white. African.
λ. With black. Canary.
μ. With yellow. Porta Santa.
ν. With purplish. Lesbian.
ξ. With green. Lacedemonian.

Forms stratarial mountains in almost every part of the globe, exhibiting innumerable varieties of colour and depictment; is more or less loaded with petrifications, particularly of the testaceous kind; burns into a very good lime, and is chiefly used in sculpture, and costly buildings.

13. M. vulgatum. Common or compact limestone. Subopaque, compact, of a splintery

fracture, receiving an indifferent polish, or none; of a vile colour. Found in vast mountainous masses; sometimes in rounded lumps, as at Aberthaw in Glamorganshire, sometimes on the beach in the form of shingles; colour greyish, bluish, blackish, cream-colour, flesh-colour, yellowish, intermingled; differs from proper marble only in colour and polish, and is the material used for burning into lime.

14. M. fissile. Fissile limestone. Compact limestone. Opaque, compact, composed of thinner strata. Found in various parts of Britain, Sweden, and on Mount Calpi near Gibraltar, blue, grey, or brown, sometimes of two colours with alternate white, reddish-brown, grey, black, or greenish layers.

MARMORA, a river of European Turkey, which runs into the Strimon, six miles N.W. Emboli, in the province of Macedonia.

MARMORA, a town of European Turkey, in the province of Macedonia: thirty-four miles E.N.E. Saloniki.

MARMORA, an island in the Straits of Constantinople, or the Sea of Marmora, about ten miles long, and three wide: it contains a town of the same name, and a few villages; most of the inhabitants are Greek Christians. Lon. 45. 20 E. Lat. 40. 28 N.

MARMORA, or WHITE SEA, a gulf between the Straits of Constantinople and the Straits of Gallipoli, so called. It is about thirty leagues in length from east to west, and thirteen broad from north to south: it takes the name of Marmora from the island so called. This was the ancient Propontis.

MARMORA'TION. *s.* (*marmor*, Lat.) Incrustation with marble.

MARMO'REAN. *a.* (*marmoreus*, Latin.) Made of marble.

MARMORICA, a country of Africa, anciently inhabited by the Libyans. It was bounded on the east by Egypt, on the west by Cyrenaica, on the south by Sahara, or the desert of Libya Interior, and on the north by the Mediterranean; and was reckoned a part of Egypt. There is no distinct history of the country.

MARMOSE, in mastiology. See DIDELPHIS.

MARMOT, in mastiology. See ARCTOMYS.

MARNE, a department of France, including part of the late province of Champagne. It takes its name from a river which rises near Langres, and flowing N.W. joins the Seine, a little above Paris. Rheims is the archiepiscopal see, but Chalons is the capital.

MARNE (Upper), a department of France, including part of the late province of Champagne. Chaumont is the capital.

MARNE, a town of Persia, in the province of Chorasan, 200 miles N. of Herat.

MARNHULL, a village in Dorsetshire, on the Stour, five miles S.W. of Shaftsbury. The church is an ancient lofty building; the tower of which fell in 1710, in time of divine service, but was handsomely rebuilt.

MARO, a town of Italy, on the coast of Genoa, in a valley of the same name, eight miles N.W. of Oneglia, and 48 W.S.W. of Genoa. Lon. 7. 41 E. Lat. 44. 55 N.

MAROGNA, a town of Romania, with a Greek archbishop's see, seated near the Mediterranean, 70 miles S.W. of Adrianople. Lon. 25. 41 E. Lat. 40. 59 N.

MARONITES, in ecclesiastical history, a sect of Eastern Christians, who follow the Syrian rite, and are subject to the pope; their principal habitation being on mount Libanus.

Mosheim informs us, that the doctrine of the Monothelites, condemned and exploded by the council of Constantinople, found a place of refuge among the Mardaites, a people who inhabited the mounts Libanus and Antilibanus, and who, about the conclusion of the seventh century, were called Maronites, after Maro, their first bishop; a name which they still retain.

Faustus Nairon, a Maronite, settled at Rome, has published an apology for Maron, and the rest of his nation. His tenet is, that they really took their name from the Maron, who lived about the year 400, and of whom mention is made in Chrysostom, Theodoret, and the Menologium of the Greeks. He adds, that the disciples of this Maron spread themselves throughout all Syria; that they built several monasteries, and, among others, one that bore the name of their leader; that all the Syrians, who were not tainted with heresy, took refuge among them; and that, for this reason, the heretics of those times called them Maronites.

Mosheim observes, that the subjection of the Maronites to the spiritual jurisdiction of the Roman pontiff was agreed to with this express condition, that neither the popes nor their emissaries should pretend to change or abolish any thing that related to the ancient rites, moral precepts, or religious opinions of this people. The attachment of the Maronites to the church of Rome was always merely interested and never warm. Indeed it is certain that there are Maronites in Syria, who still behold the church of Rome with the greatest aversion and abhorrence; nay, what is still more remarkable, great numbers of that nation residing in Italy, even under the eye of the pontiff, opposed his authority during the last century, and threw the court of Rome into great perplexity. One body of these non-conforming Maronites retired into the vallies of Piedmont, where they joined the Waldenses; another, above above six hundred in number, with a bishop, and several ecclesiastics at their head, fled into Corsica, and implored the protection of the republic of Genoa, against the inquisitors.

The Maronites have a patriarch, who resides in the monastery of Cannubin, on mount Libanus, and assumes the title of patriarch of Antioch, and the name of Peter, as if he seemed desirous of being considered as the successor of that apostle. He is elected by the clergy and the people, according to the ancient custom; but, since their reunion with the church of Rome, he is obliged to have a bull of confirmation from the pope. He keeps a perpetual

celibacy, as well as the rest of the bishops his suffragans: as to the rest of the ecclesiastics, they are allowed to marry before ordination; and yet the monastic life is in great esteem among them. Their monks are of the order of St. Antony, and live in the most obscure places in the mountains, far from the commerce of the world.

As to their faith, they agree in the main with the rest of the Eastern church. Their priests do not say mass singly; but all say it together, standing round the altar. They communicate in unleavened bread; and the laity have hitherto partaken in both kinds, though the practice of communicating in one has of late been getting footing, having been introduced by little and little. In Lent they eat nothing, unless it be two or three hours before sun-rising: their other fastings are very numerous.

To MAROON, to put one or more sailors ashore upon a desolate island, under pretence of their having committed some great crime. This detestable expedient has been repeatedly practised by some inhuman commanders of merchant-ships, particularly in the West Indies.

MAROT (Clement), the best French poet of his time, was born at Cahors in 1495, and was the son of John Marot, valet de chambre to Francis I. and poet to queen Anne of Brittany. He enjoyed his father's place of valet de chambre to Francis I. and was page to Margaret of France, wife to the duke of Alençon. In 1521 he followed that prince into Italy, and was wounded and taken prisoner at the battle of Pavia; but at his return to Paris was accused of heresy, and thrown into prison, from whence he was delivered by the protection of king Francis I. He at length retired to the queen of Navarre, then to the duchess of Ferrara, and in 1536 returned to Paris: but declaring openly for the Calvinists, he was obliged to fly to Geneva; which he at length left, and, retiring to Piedmont, died at Turin in 1544, aged 50. His verses are agreeably filled with natural beauties. La Fontaine acknowledged himself his disciple, and contributed greatly to restore to vogue the works of this ancient poet. Marot, besides his other works, has translated part of the Psalms into verse, which was continued by Beza, and are still sung in the Protestant churches abroad. Michael Marot, his son, was also the author of some verses; but they are not comparable to those of John, and much less to those of Clement Marot.—The works of the three Marots were collected and printed together at the Hague in 1731, in 3 vols. 4to. and in 6 vols. 12mo.

MAROTIER, a town of France, in the department of Lower Rhine, with a late Benedictine abbey, 18 miles N.W. of Strasburg. Lon. 7. 33 E. Lat. 48. 38 N.

MARPACH, a town of Suabia, in the duchy of Wirtemberg, situate on the Necker, eight miles N.N.E. of Stutgard, and 30 E.N.E. of Wildbad. Lon. 9. 7 E. Lat. 48. 51 N.

MARPESIA, in fabulous history, a celebrated queen of the Amazons, who waged a successful war against the inhabitants of mount Caucasus. The mountain was called Marpesius Mons, from its female conqueror.

MARPESSA, in fabulous history, a daughter of the Evenus, who married Idas, by whom she had Cleopatra, the wife of Meleager. Marpessa was tenderly loved by her husband, and when Apollo endeavoured to carry her away, Idas followed her ravisher with a bow and arrows, resolved on revenge. Apollo and Idas were separated by Jupiter, who permitted Marpessa to go with that of the two lovers whom she most approved of. She returned to her husband.

MARPESUS, a mountain of Paros, abounding in white marble, whence Marpesia cautes. The quarries are still seen by modern travellers.

MARPURG, a strong town of Germany, in the landgravate of Hesse Cassel, with a university, a castle, and a palace. It is seated on the Lahn, 15 miles S. of Waldeck, and 47 S.W. of Cassel. Lon. 9. 0 E. Lat. 50. 35 N.

MARQUARD (Freher), an eminent German civilian, born at Augsburg in 1565. He studied at Bourges under the learned Cujas, and acquired great skill in polite literature, and in the laws. At his return to Germany, he became counsellor to the elector Palatine, and professor of law at Heidelberg; and was afterwards sent by the elector Frederick IV. as his minister, into Poland, to Mentz, and several other courts. He died at Heidelberg in 1614. He wrote many works which are esteemed; the principal of which are, 1. De re monetaria veterum Romanorum, et hodierni apud Germanos imperii. 2. Rerum Bohemicarum scriptores. 3. Rerum Germanicarum scriptores. 4. Corpus historiæ Franciæ, &c.

MARQUE, or LETTERS OF MARQUE, in military affairs, are letters of reprisal, granting the subjects of one prince or state liberty to make reprisals on those of another.—They are so called from the German *marcke*, limit, frontier; as being "jus concessum in alterius principis marckas seu limites transeundi, sibique jus faciendi;" as being a right of passing the limits or frontiers of another prince, and doing one's self justice.

Letters of marque, among us, are extraordinary commissions granted by authority for reparation to merchants taken and despoiled by strangers at sea; and reprisals is only the retaking, or taking of one thing for another. The form in these cases is, the sufferer must first apply to the lord privy-seal, and he shall make out letters of request under the privy-seal; and if, after such request of satisfaction made, the party required do not, within convenient time, make due satisfaction or restitution to the party grieved, the lord-chancellor shall make him out letters of marque under the great seal; and by virtue of these he may attack and seize the property of the aggressor nation, without hazard of being condemned as a robber or pirate.

MARQUESAS, a group of islands in the S. Pacific Ocean, of which the most considerable are, St. Christina and St. Pedro. Captain

Cooke, in his second voyage, lay some time at the first of these, which is situate in lon. 139. 9 W. and lat. 9. 55 S. It is high and steep, but has many vallies, which widen towards the sea, and are covered with fine forests to the summits of the interior mountains. The products of these and the other islands are bread-fruit, bananas, plantains, cocoa-nuts, scarlet-beans, paper-mulberries (of the bark of which their cloth is made), casuarinas, with other tropical plants and trees, and hogs and fowls. The natives are well made, strong, and active; of a tawny complexion, but look almost black, by being punctured over the whole body. They go almost naked, having only a small piece of cloth, perfectly resembling that made by the people of Otaheite, round their waist and loins. Their beard and hair are of a fine jet black, like those of the other natives of the torrid zone. Their arms are clubs and spears, and their government, like that of the Society Islands, monarchical. The drink of the Marquesans is water only, cocoa-nuts being rather scarce. Their music, musical instruments, dances, and canoes, very much resemble those of Otaheite. In short, the inhabitants of the Marquesas, Society and Friendly Islands, Easter Island, and New Zealand, seem to have all the same origin; their language, manners, customs, &c. bearing a great affinity in many respects.

MARQUETRY, in-laid work; a curious kind of work, composed of pieces of hard fine wood of different colours, fastened, in thin slices, on a ground, and sometimes enriched with other matters, as tortoise-shell, ivory, tin, and brass. There is another kind of marquetry made, instead of wood, of glasses of various colours; and a third, where nothing but precious stones and the richest marbles are used: but these are more properly called mosaic-work. See Mosaic.

The art of inlaying is very ancient; and is supposed to have passed from the east to the west, as one of the spoils brought by the Romans from Asia. Indeed it was then but a simple thing; nor did it arrive at any tolerable perfection till the 15th century among the Italians; it seems, however, to have arrived at its height in the 17th century among the French.

Till John of Verona, a cotemporary with Raphael, the finest works of this kind were only black and white, which are what we now call morescos: but that religious, who had a genius for painting, stained his woods with dyes or boiled oils, which penetrated them. But he went no farther than the representing buildings and perspectives, which require no great variety of colours. Those who succeeded him not only improved on the invention of dyeing the woods, by a secret which they found of burning them without consuming, which served exceedingly well for the shadows; but had also the advantage of a number of fine new woods of naturally bright colours, by the discovery of America. With these assistances the art is now capable of imitating any thing; whence some call it the art of painting in wood.

The ground whereon the pieces are to be ranged and glued is ordinarily of oak or fir well dried; and, to prevent warping, is composed of several pieces glued together. The wood to be used, being reduced into leaves, of the thickness of a line, is either stained with some colour, or made black for shadow; which some effect by putting it in sand extremely heated over the fire, others by steeping it in lime-water and sublimate, and others in oil of sulphur. Thus coloured, the contours of the piece are formed according to the parts of the design they are to represent.

The leaves to be formed, of which there are frequently three, four, or more joined together, are, after they have been glued on the outermost part of the design, whose profile they are to follow, put within the chaps of the vice; then the workman pressing the treddle, and thus holding fast the piece, with his saw runs over all the outlines of his design. By thus joining or forming three or four pieces together, not only time is saved, but also the matter is the better enabled to sustain the effort of the saw, which, how fine soever it may be, and how slightly soever it may be conducted by the workman, except this precaution were taken, would be apt to raise splinters, and ruin the beauty of the work. All the pieces having been thus formed by the saw, and marked, in order to their being known again, each is veneered, or fastened in its place, on the common ground, with the best English glue; and this being done, the whole is set in a press to dry, planed over and polished with the skin of the sea-dog, wax, and shave-grass, as in simple veneering, and the fine branches and more delicate parts of the figures are touched up and finished with a graver.

MARQUIS, a title of honour, next in dignity to that of duke, first given to those who commanded the marches, that is, the borders and frontiers of countries. Marquisses were not known in England till king Richard II. in the year 1337, created his great favourite, Robert Vere, the earl of Oxford, marquis of Dublin; since which time there have been many creations of this sort, though at present there are twelve English, two Scotch, and nine Irish marquisses. The manner of creating a marquis differs in nothing from that of a duke, except the difference of the titles, and the marquis's being conducted by a marquis and an earl, while a duke is led by a duke and a marquis: he is also girt with a sword, has a gold verge put into his hand, and his robe or mantle is the same as those of a duke, with only this difference, that a duke's mantle has four guards of ermine, and a marquis's only three and a half. The title given him in the style of the heralds, is most noble and potent prince. His cap is the same as a duke's, and the difference between their coronets consists in the duke's being adorned with only flowers or leaves, while the marquis's has flowers and pyramids with pearls on them intermixed, to shew that he is a degree between a duke and an earl.

MA'RQUISATE. *s.* (*marquisat*, French.) The seniory of a marquis.

MA'RRER. *s.* (from *mar.*) One who spoils or hurts any thing (*Ascham*).

MA'RRIAGE. *s.* (*mariage*, French.) 1. The act of uniting a man or woman for life (*Taylor*). 2. State of perpetual union.

MARRIAGE, a contract, both civil and religious, between a man and a woman, by which they engage to live together in mutual love and friendship for the ends of procreation, &c.

Marriage is part of the law of nations, and is in use among all people. The Romanists account it a sacrament. The woman with all her moveable goods, immediately upon marriage, passes wholly *in potestatem viri*, into the power and disposal of the husband.

The first inhabitants of Greece lived together without marriage. Cecrops, king of Athens, is said to have been the first author of this honourable institution among that people. After the commonwealths of Greece were settled, marriage was very much encouraged by their laws, and the abstaining from it was discountenanced and in many places punished. The Lacedemonians were very remarkable for their severity towards those who deferred marriage beyond a limited time, as well as to those who wholly abstained from it. The Athenians had an express law, that all commanders, orators, and persons intrusted with any public affair, should be married men. Polygamy was not commonly tolerated in Greece. The time of marriage was not the same in all places. The Spartans were not permitted to marry till they arrived at their full strength; the reason assigned for which custom by Lycurgus was, that the Spartan children might be strong and vigorous: and the Athenian laws are said to have once ordered, that men should not marry till 35 years o age. The season of the year which they preferred for this purpose was the winter, and particularly the month of January, called Gamelion. The Greeks thought it scandalous to contract marriage within certain degrees of consanguinity; whilst most of the barbarous nations allowed incestuous mixtures.

Most of the Grecian states, especially such as made any figure, required their citizens should match with none but citizens, and the children were not allowed to marry without the consent of their parents. The usual ceremonies in promising fidelity was kissing each other, or giving their right hands, which was a general form of ratifying all agreements. Before the marriage could be solemnized, the gods were to be consulted, and their assistance implored by prayers and sacrifices, which were offered to some of the deities that superintended these affairs, by the parents, or nearest relations of the persons to be married. When the victim was opened, the gall was taken out and thrown behind the altar, as being the seat of anger and malice, and therefore the aversion of all the deities who had the care of love, as well as those who became their votaries. For the particularities relating to the bride and bridegroom, see BRIDE and BRIDEGROOM.

The ceremonies of the Spartan marriages being different from all others, deserve to be mentioned at length, as related by Plutarch. "When the Spartans had a mind to marry, their courtship was a sort of rape upon the persons they had a fancy for; and those they chose not tender and half-children, but in the flower of their age, and full ripe for a husband. Matters being agreed between them, the νυμφευτρια, or woman that contrived and managed the plot, shaved off the bride's hair close to her skin, dressed her up in man's clothes, and left her upon a mattress: this done, the bridegroom entered in his common clothes, sober and composed, as having supped at his ordinary in the common hall, and stole as privately as he could into the room where the bride lay, untied her virgin girdle, when λυειν ζωνην, is to deflower, and took her into his embraces. Having stayed a short time with her, he returned to his comrades, with whom he continued to spend his life, remaining with them as well by night as by day, unless when he stole a short visit to his bride; and that could not be done without a great deal of circumspection, and fear of being discovered. Nor was she wanting (as may be supposed) on her part, to use her wit in watching the most favourable opportunities for their meeting, and making appointments when company was out of the way. In this manner they lived a long time, insomuch that they frequently had children by their wives before they saw their faces by day-light. The interview being thus difficult and rare, served not only for a continual exercise of their temperance, and farthered very much the ends and intentions of marriage, but was a means to keep their passion still alive, which flags and decays, and dies at last by too easy access, and long continuance with the beloved object." Potter, Archaeol. book iv. c. xi. p 295, seq.

The Romans, as well as the Greeks, disallowed of polygamy. A Roman might not marry any woman who was not a Roman. Among the Romans, the kalends, nones, and ides of every month, were deemed unlucky for the celebration of marriage, as was also the feast of the parentalia, and the whole month of May. The most happy season in every respect was that which followed the ides of June.

The Roman laws speak of second marriages in very hard and odious terms: *Matre jam secundis nuptiis funestata*, L. iii. C. de sec. nuptiis. By these laws it was enacted, that the effects of the husband or wife deceased should pass over to the children, if the survivor should marry a second time. By the law *Hac edictali*, Cod. de sec. nupt. the survivor, upon marrying a second time, could not give the person he married a portion more than equal to that of each of the children. In the primitive church, the respect to chastity was carried so high, that a second marriage was accounted no other than a lawful whoredom, or a species of bigamy; and there are some ancient canons, which forbid the ecclesiastics from being present at second marriages.

Marriage, by the Mosaic law, was subject to

several restrictions; thus by Levit. chap. xviii. ver. 16. a man was forbid to marry his brother's widow, unless he died without issue; in which case, it became enjoined as a duty. So it was forbid to marry his wife's sister, while she was living, ver. 18., which was not forbidden before the law, as appears from the instance of Jacob.

The ancient Roman law is silent on this head; and Papinian is the first who mentions it, on occasion of the marriage of Caracalla. The lawyers who came after him stretched the bonds of affinity so far, that they placed adoption on the same footing with nature.

Affinity, according to the modern canonists, renders marriage unlawful to the fourth generation, inclusive; but this is to be understood of direct affinity, and not of that which is secondary or collateral. *Affinis mei affinis, non est affinis meus.* It is farther to be observed that this impediment of marriage does not only follow an affinity contracted by lawful matrimony, but also that contracted by a criminal commerce; with this difference, that this last does not extend beyond the second generation; whereas the other, as has been observed, reaches to the fourth.

In Germany, they have a kind of marriage called morganatic, wherein a man of quality contracting with a woman of inferior rank, he gives her the left hand in lieu of the right; and stipulates in the contract, that the wife shall continue in her former rank or condition, and that the children born of them shall be of the same; so that they become bastards as to matters of inheritance, though they are legitimate in effect. They cannot bear the name or arms of the family.

None but princes, and great lords of Germany, are allowed this kind of marriage. The universities of Leipsic and Jena have declared against the validity of such contracts; maintaining, that they cannot prejudice the children, especially when the emperor's consent intervenes in the marriage.

The Turks have three kinds of marriages, and three sorts of wives; legitimate, wives in kebin, and slaves. They marry the first, hire the second, and buy the third.

The people in Java marry and have children at nine or ten years old, and the women leave child-bearing before they are thirty; and at Tonquin there are women common to any that will hire them, at eight or nine years of age.

Among all the savage nations, whether in Asia, Africa, or America, the wife is commonly bought by the husband from her father, or those other relations who have an authority over her; and the conclusion of a bargain for this purpose, together with the payment of the price, has, therefore, become the usual form or solemnity in the celebration of their marriages. The Hebrews also purchased their wives, by paying down a competent dowry for them; and Aristotle makes it one argument to prove that the ancient Grecians were an uncivilized people, because they used to buy their wives; and in proportion as they laid aside their barbarous manners, they left off this practice.

Taking marriage in the light of a civil contract, the law treats it as it does all other contracts: allowing it to be good and valid in all cases where the parties, at the time of making it, were in the first place willing to contract; secondly, able to contract; and lastly, actually did contract, in the proper forms and solemnities required by law.

By several statutes, a penalty of 100l. is inflicted for marrying any persons without banns or licence; but by 26 George II. c. 33, if any person shall solemnize matrimony without banns or licence, obtained from some persons having authority to grant the same, or in any other place than a church or chapel where banns have been usually published, unless by special licence from the archbishop of Canterbury, he shall be guilty of felony, and transported for fourteen years, and the marriage shall be void. Marriages according to the laws of any other country are valid in England, if duly solemnized in another country, as marriages in Scotland are; but by 26 George II. c. 33, s. 11, marriages by licence, where the parties are not twenty-one, must not be without consent of the father or guardian of the party. If the guardian or mother is beyond sea, or insane, the chancellor will proceed upon relation in their stead. Questions have lately arisen, whether this act applies to illegitimate children, and the civilians have held that it does. Marriages cannot be solemnized between persons within the Levitical degrees, but if solemnized, they are not void till after sentence of the proper court. Promises of marriage, and pre-contracts, do not prevent the parties from lawfully marrying other persons: but an action lies for a breach of the contract. Marriage brokage bonds are void in equity, and all contracts in restraint of marriage generally are void; but contracts and legacies, upon condition not to marry any particular person, or without proper consent, are allowed, though if there is not a devise over the legacy is vested nevertheless. To marry a woman an heiress forcibly, is a capital felony by 3 Henry VII. c. 2, and 39 Elizabeth, c. 9.

A wife cannot leave her husband. If she elope from him, she loses her dower, unless she returns and is reconciled. An action of trespass lies for taking away a wife, with the goods of her husband, and also for criminal conversation with the wife of any one.

If a man ill use and turn his wife away, she has credit for necessaries wherever she goes, and he is obliged to pay her debts; but it is otherwise if she elopes or commits adultery. A married woman cannot be sued for her own debts, although she has a separate maintenance.

Divorces are of two kinds, absolute, and from bed and board. The former can only be by act of parliament, unless it is for some original defect in the marriage; the latter is allowed on account of ill-treatment, &c., and then the wife has alimony or maintenance allowed her.

For the proportions which marriages bear to births, and births to burials, in several parts of Europe, Mr. Derham gives us the following table,

MARRIAGE.

Names of Places.	Marriages to Births, as	Births to Burials, as
England in general	1 to 4.63	1.12 to 1
London	1 to 4	1. to 1.1
Hantshire, from 1569 to 1658	1 to 4	1.2 to 1
Tiverton in Devonshire, from 1656 to 1664	1 to 3.7	1.26 to 1
Cranbrook in Kent, from 1560 to 1649	1 to 3.9	1.6 to 1
Aynho in Northamptonshire, for 118 years	1 to 6	1.9 to 1
Upminster in Essex, for 100 years	1 to 4.6	1.8 to 1
Frankfort on the Maine, in 1695	1 to 3.7	1.2 to 1
Old, Middle, and Lower Mark, in 1698	1 to 3.7	1.9 to 1
Dominions of the Elector of Brandenburg, in 1698	1 to [illegible].7	1.5 to 1
Breshaw in Silesia, from 1687 to 91	———	1.6 to 1
Paris, in 1670, 1671, 1672	1 to 4.7	1.6 to 1

The following table, similar to the preceding, is formed from the observations collected and referred to by Dr. Price It is taken from Chambers's Cyclopædia, by Dr. Rees·

Names of Places.	Marriages to Births, as	Births to Burials, as
London, Annual medium from 1716 to 1726	— — —	18.000 to 2[illegible]29, or 1 to 1 4, &c.
———— from 1759 to 1768	— — —	15,710 to 22,9[illegible], or 1 to 1 4, &c.
Northampton, ditto, from 1741 to 1770	— — —	155 to 161, or 1 to 1 2, &c.
Norwich, ditto, from 1740 to 1769	— — —	1057 to 1[illegible], or 1 to 1.1, &c
Shrewsbury, ditto, from 1762 to 1768	— — —	301 to 329, or 1 to 1.09, &c
Manchester and Salford, exclusive of dissenters		
Ditto, from 1755 to 1759	— — —	756 to 743,————
Ditto, ditto, including dissenters, from 1768 to 1772	— — —	1098 to 958, or 1.14, &c. to 1.
Gainsborough in Lincolnshire, ditto, from 1752 to 1771	1 to 3.7	120 to 105, or 1.2 to 1.
Madeira, ditto, from 1759 to 1766	1 to 4.08	2201 to 1203, or 1.7 to 1.
Boston in New England, from 1731 to 1752	— — —	538 to 608, or 1 to 1.13, &c.
Christiana in Norway, in 1761	— — —	11,024 to 6929, or 1.5 to 1.
Paris, mean of some of the last years	1 to 4.3	19,100 to 19,400, or 1 to 1.01, &c
Vienna, annual medium from 1757 to 1769	— — —	5800 to 6600, or 1 to 1.1, &c.
Amsterdam, ditto, for some of the last years	1 to 1.9, &c.	4600 to 8000, or 1 to 1 1, &c.
Copenhagen, ditto	1 to 3.04, &c.	2700 to 3300, or 1 to 1.[illegible], &c.
Berlin, ditto, for five years, ending at 1759	1 to 3.9, &c.	3355 to 5054, or 1 to 1.3, &c.
Breslaw, ditto, from 1633 to 1734	— —	1089 to 1250, or 1 to 1.15, &c
————, ditto, from 1717 to 1725	— —	12[illegible]2 to 1507, or 1 to 1.2, &c
Rome, ditto, from 1759 to 1761	— —	5167 to 7153, or 1 to 1.3, &c
Vaud in Switzerland, ditto, for 10 years before 1766	1 to 3.9	3155 to [illegible], or 1 [illegible], &c. to 1.

It would hence appear, and indeed is pretty universally admitted, that marriages do, one with another, each produce about *four* births. Dr. Price observes, that the births at Paris are above four times the weddings; and therefore it may seem, that in the most healthy country

situations, every wedding produces above four children; and though this be the case in Paris, for reasons which he has given, he has observed nothing like it in any other great town. He adds, that from comparing the births and weddings in countries and towns where registers of them have been kept, it appears, that in the former, marriages one with another seldom produce less than four children each; generally between four and five, and sometimes above five; but in towns seldom above four, generally between three and four, and sometimes under three. It is necessary to be observed here, that though the proportion of annual births to weddings has been considered as giving the true number of children derived from each marriage, taking all marriages one with another; yet this is only true, when, for many years, the births and burials have kept nearly equal. Where there is an excess of the births, occasioning an increase, the proportion of annual births to weddings must be less than the proportion of children derived from each marriage; and the contrary must take place where there is a decrease. Mr. Kersseboom from his observations, estimates the duration of *marriages*, one with another, as in the following table:

Those whose ages, taken together, make			
40	live together between	24 and	25 years.
50	. .	22	23
60	. .	23	21
70	. .	19	20
80	. .	17	18
90	. .	14	15
100	. .	12	13

Phil. Trans. No. 468. sect. iii. p. 319.*

Dr. Price has shewn, that on De Moivre's hypothesis, or that the probabilities of life decrease uniformly (see COMPLEMENT OF LIFE), the duration of survivorship is equal to the duration of marriage, when the ages are equal; or, in other words, that the expectation of two joint lives, the ages being equal, is the same with the expectation of survivorship; and, consequently, the number of survivors, or (which is the same, supposing no second marriages) of widows and widowers alive together, which will arise from any given set of such marriages constantly kept up, will be equal to the whole number of marriages, or half of them (the number of widows in particular) equal to half the number of marriages. Thus, the expectation of two joint lives, both 40, is the third of 46 years, or their complement, i. e. 15 years and 4 months; and this is also the expectation of the survivor. That is, supposing a set of marriages between persons all 40, they will, one with another, last just this time, and the survivors will last the same time. In adding together the years which any great number of such marriages, and their survivorships, have lasted, the sums would be found to be equal. It is observed farther, that if the number expressing the expectation of single or joint lives, multiplied by the number of single or joint lives whose expectation it is, be added annually to a society or town, the sum gives the whole number living together, to which such an annual addition would in time grow: thus, since 19, or the third of 57, is the expectation of two joint lives, whose common age is 29, or common complement 57, twenty marriages every year between persons of this age would, in fifty-seven years, grow to 20 times 19, or 380 marriages always existing together. The number of survivors also arising from these marriages, and always living together, would, in twice 57 years, increase to the same number. Moreover, the particular proportion that becomes extinct every year, out of the whole number constantly existing together of single or joint lives, must, wherever this number undergoes no variation, be exactly the same with the expectation of those lives, at the time when their existence commenced. Thus, if it were found that a nineteenth part of all the marriages among any body of men, whose numbers do not vary, are dissolved every year by the deaths of either the husband or wife, it would appear that 19 was, at the time they were contracted, the expectation of these marriages. Dr. Price observes, that the annual average of weddings among the ministers and professors in Scotland for twenty-seven years was about thirty-one; and the average of married persons for seventeen years, ending in 1767, had been 667. This number, divided by 31, gives 21½, the expectation of marriage among them, which, he says, is above 2½ years more than the expectation of marriage would be by Dr. Halley's table, on the supposition that all first, second, and third marriages may be justly considered as commencing, one with another, so early as the age of thirty; and he has proved that the expectation of two equal joint lives is to the expectation of a single life of the same age as 2 to 3, consequently, the expectation of a single life at 30, among the ministers in Scotland, cannot be less than 32.25. If we suppose the mean ages of all who marry annually to be 33 and 25, the expectation of every marriage would be 19 years; or one with another they would be all extinct in 19 years; the marriages which continue beyond this term, though fewer in number, enjoying among them just as much more duration as those that fall short of it enjoy less. But it appears from the observations and tables of Mr. Muret, that, in the district of Vaud (dividing half the number of married persons, viz. 38,328, by the annual medium of weddings, viz. 808) the expectation of marriage is only 23½ years: so much higher are the probabilities of life in the country than in towns, or than they ought to be, according to De Moivre's hypothesis. Price's Obs. &c. See EXPECTATION OF LIFE, LIFE-ANNUITIES, and SURVIVORSHIP.

MA'RRIAGEABLE. *a.* (from *marriage*). 1. Fit for wedlock; of age to be married. 2. Capable of union (*Milton*).

MA'RRIED. *a.* (from *marry*). Conjugal; connubial (*Dryden*).

MARROW. The concrete oily matter secreted into the bony cells and canals of animals; as *suet* is that which is secreted into the cells of the cellular membrane about the kid-

neys, and other abdominal viscera of the herbivorous and frugivorous tribes; and *spermaceti* that secreted in the cranium of the cachalot or physeter macrocephalus. The marrow of the ox, on distillation, affords similar products to suet, except that there passes first into the receiver a white suet resembling the butter of wax. It affords an insipid water, much oil, the greater part of which again becomes fixed, and a little phlegm: an acid is hence also obtained.

Marrow (Spinal). See Medulla.

Marrow. Medulla. In botany, the pith of a vegetable. The inner vesicular substance, or that which clothes the inner surface of a hollow trunk, consisting chiefly of air-vessels; but formerly supposed by Linnéus to have a near resemblance to the medulla spinalis of animals, on which account he thus named it. Its place, as vegetables advance to maturity, is supplied by the air-vessels of the surface of the branches and leaves, and in the same proportion it becomes gradually obliterated.

MA'RROWBONE. *s.* (*marrow* and *bone*). 1. Bone boiled for the marrow 2. In burlesque language, the knees (*L'Estr.*).

MA'RROWFAT. *s.* A kind of pea.

MA'RROWLESS. *a.* (from *marrow*). Void of marrow (*Shakspeare*).

MARRUBIUM. White horehound. In botany, a genus of the class didynamia, order gymnospermia. Calyx salver-shaped, rigid, tenstriate; upper lip of the corol cloven, linear, straight. Fourteen species: chiefly natives of Spain and the Levant; one indigenous to the Cape; one common to our own country. In about half, the calyx is five-toothed, in the rest ten-toothed. The species of most note is the M. vulgare: leaves roundish-ovate, toothed, wrinkled, and veined; calyx with setaceous, hooked teeth. Found wild on our own wastes. The leaves have a moderately strong smell of the aromatic kind, but not agreeably so; the disagreeableness, however, diminishes by drying, and at last is totally dissipated: their taste is very bitter, penetrating, diffusive, and durable in the mouth. These qualities claim for it a medicinal character; but it does not appear to be possessed of any great or peculiar virtue. It is nevertheless a favourite remedy with the common people in coughs and asthmas.

Marrubium, or Marruvium, a place near the Liris in Italy.

To MA'RRY. *v. a.* (*marier*, French.) 1. To join a man and a woman (*Gay*). 2. To dispose of in marriage (*Bacon*). 3. To take for husband or wife (*Shakspeare*).

To Ma'rry. *v. n.* To enter into the conjugal state (*Shakspeare*).

MARS, the god of war, was the son of Jupiter and Juno, or of Juno alone, who had wished to become a mother without the assistance of the other sex, like Jupiter, who had produced Minerva all armed from his head, and she was shown a flower by Flora in the plains near Olenus, whose very touch made women pregnant. The education of Mars was entrusted by Juno to the god Priapus, who instructed him in dancing and every manly exercise. His trial before the celebrated court of the Areopagus, according to the authority of some authors, for the murder of Hallirhotius, forms an interesting epoch. Mars having killed Hallirhotius, Neptune's son, for having violated the chastity of his daughter, Alcippe, Neptune accused him before the tribunal of twelve gods, where he was acquitted. The place in Athens where this judgment was pronounced has been since called Αρειος πάγος, because it was an eminence or a rock; and the judges from thence took the name of Areopagites. This action of Mars might very well induce the Greeks to attribute unto him what the most ancient and eastern nations had already published concerning the god of war. Dionysius of Halicarnassus says, that the Sabines and the Romans gave the name of Quirinus to the god Enyalius, being in some doubt whether he were god Mars himself, or another god who presided over military adventures. The amours of Mars and Venus are greatly celebrated. The god of war gained the affections of Venus, but Apollo informed Vulcan of his wife's debaucheries. Vulcan secretly laid a net around the bed, and the two lovers were exposed to the ridicule of all the gods, till Neptune prevailed upon the husband to set them at liberty. In the wars of Jupiter and the Titans, Mars was seized by Otes and Ephialtes, and confined for fifteen months, till Mercury procured him his liberty. During the Trojan war he took the side of the Trojans, and defended the favourites of Venus with uncommon activity. His temples were not numerous in Greece, but in Rome he received unbounded honours, and the warlike Romans were proud of paying homage to a deity whom they esteemed as the patron of their city, and the father of the first of their monarchs. His priests, among the Romans, were called Salii; they were first instituted by Numa, and their chief office was to guard the sacred Ancylla, one of which, as was supposed, had fallen down from heaven. Mars was generally represented in the naked figure of an old man, armed with a helmet, a pike, and a shield. He generally rode in a chariot drawn by furious horses, which the poets called Flight and Terror. The surnames of Mars are, Gradivus, Mavors, Quirinus, Salisubsulus, among the Romans. The Greeks called him Ares, and he was the Camulus of the Gauls, and the Mamers of Carthage. Mars was the father of Cupid, Anterus, and Harmonia, by the goddess Venus. He was the reputed father of Romulus. He presided over gladiators, and was the god of hunting and of whatever exercise or amusements have something manly and warlike.

Mars, in astronomy, the planet that revolves next beyond the earth in our system. For its dimensions and the elements of its orbit, see Astronomy.

The spots on the surface of this planet were first observed in 1666 by Cassini at Bologna,

with a telescope about 16½ feet long; and continuing to observe them for a month, he found they came into the same situation in twenty-four hours and forty minutes. The planet was observed by some astronomers at Rome with longer telescopes, but they assigned to it a rotation in thirteen hours only. This, however, was afterwards shewn by M. Cassini to have been a mistake, and to have arisen from their not distinguishing the opposite sides of the planet, which, it seems, have spots pretty much alike. He made further observations on the spots of this planet in 1670, from whence he drew an additional confirmation of the time the planet took to revolve. The spots were again observed in subsequent oppositions, particularly for several days in 1704, by Maraldi, who took notice that they were not always well defined, and that they not only changed their shape frequently in the space between two oppositions, but even in the space of a month. Some of them, however, continued of the same form long enough to ascertain the time of the planet's revolution. Among these there appeared that year an oblong spot, resembling one of the belts of Jupiter when broken. It did not reach quite round the body of the planet, but had, not far from the middle of it, a small protuberance towards the north, so well defined, that he was thereby enabled to settle the period of its revolution at twenty-four hours thirty-nine minutes, only one minute less than what Cassini had determined it to be.

Besides these dark spots, former astronomers took notice that a segment of his globe about the south pole exceeded the rest of his disk so much in brightness, that it appeared beyond them as if it were the segment of a larger globe. Maraldi informs us that this bright spot had been taken notice of for sixty years, and was more permanent than the other spots on the planet. One part of it is brighter than the rest, and the least bright part is subject to great changes, and has sometimes disappeared.

A similar brightness about the north pole of Mars was also sometimes observed; and these observations are now confirmed by Dr. Herschel, who has viewed the planet with much better instruments, and much higher magnifying powers than any other astronomer ever was in possession of. His observations were made with a view to determine the figure of the planet, the position of his axis, &c. See Philosophical Transactions, vol. lxxiv.

The analogy," says Dr. Herschel, "between Mars and the earth is, perhaps, by far the greatest in the whole solar system. Their diurnal motion is nearly the same; the obliquity of their respective ecliptics not very different. Of all the superior planets, the distance of Mars from the sun is by far the nearest alike to that of the earth; nor will the length of the Martial year appear very different from what we enjoy, when compared to the surprising duration of the years of Jupiter, Saturn, and the Herschel. If then we find that the globe we inhabit has its polar region frozen and covered with mountains of ice and snow, that only partly melt when alternately exposed to the sun, I may well be permitted to surmise, that the same causes may probably have the same effect on the globe of Mars; that the bright polar spots are owing to the vivid reflection of light from frozen regions, and that the reduction of those spots is to be ascribed to their being exposed to the sun. In the year 1781 the south polar spot was extremely large, which we might well expect, as that pole had but lately been involved in a whole twelvemonth's darkness and absence of the sun; but in 1783 I found it considerably smaller than before, and it decreased continually from the 20th of May till about the middle of September, when it seemed to be at a stand. During this last period the south pole had already been above eight months enjoying the benefit of summer, and still continued to receive the sun-beams, though, towards the letter end, in such an oblique direction as to be but little benefited by them. On the other hand, in the year 1781, the north polar spot which had been its twelvemonth in the sunshine, and was but lately returning into darkness, appeared small, though undoubtedly increasing in size. Its not being visible in the year 1783 is no objection to these phenomena, being owing to the position of the axis, by which it was removed out of sight. It has been commonly related by astronomers, that the atmosphere of this planet is possessed of such strong refractive powers as to render the small fixed stars near which it passes invisible. Dr. Smith relates an observation of Cassini, where a star in the water of Aquarius, at the distance of six minutes from the disk of Mars, became so faint before its occultation, that it could not be seen by the naked eye, nor with a three-feet telescope. This would indicate an atmosphere of a very extraordinary size and density; but the following observations of Dr. Herschel seem to show that it is of much smaller dimensions. "1783, October 26th. There are two small stars preceding Mars, of different sizes; with 460 they appear both dusky red, and are pretty unequal; with 218 they appear considerably unequal. The distance from Mars of the nearest, which is also the largest, with 227 measured 3′ 26″ 20‴. Sometime after, the same evening, the distance was 3′ 8″ 55‴, Mars being retrograde. Both of them were seen very distinctly. They were viewed with a new twenty-feet reflector, and appeared very bright. October 27th, the small star is not quite so bright in proportion to the large one as it was last night, being a good deal nearer to Mars, which is now on the side of the small star; but when the planet was drawn aside, or out of view, it appeared as plainly as usual. The distance of the small star was 2′ 5″·25‴. The largest of the two stars (adds he) on which the above observations were made cannot exceed the twelfth, and the smallest the thirteenth or fourteenth magnitude; and I have no reason to suppose

that they were any otherwise affected by the approach of Mars than what the brightness of its superior light may account for. From other phenomena it appears, however, that this planet is not without a considerable atmosphere; for besides the permanent spots on its surface, I have often noticed occasional changes of partial bright belts, and also once a darkish one in a pretty high latitude; and these alterations we can hardly ascribe to any other cause than the variable disposition of clouds and vapours floating in the atmosphere of the planet."

MARS. (*Mars.*) A name for iron in alchemy.

MARSAIS (Cæsar, Chesneau du), a French grammarian, born at Marseilles in 1676. He became a member of the congregation of the oratory, which he soon quitted, and went to Paris, where he became an advocate, but left that profession also, and engaged in the business of teaching youth. He had a share in the Encyclopedie, and died in 1756. His principal works are, 1. An Explanation of the Doctrine of the Gallican Church, with respect to the Pretences of the Court of Rome, 12mo.; 2. A reasonable Method of learning the Latin Language, 12mo.; 3. A Treatise on Tropes, 8vo.; 4. Les Véritables Principes de la Grammaire, 4to.

MARSAL, a town of France, in the department of Muerthe. It is remarkable for its salt-works, and seated on the Selle, in a marsh of difficult access; which, with the fortifications, renders it an important place. It is 17 miles NE. of Nanci. Lon. 6. 41 E. Lat. 48. 49 N.

MARSAQUIVER, or MARSALQUIVER, a strong and ancient town of Algiers, in Tremesen, with one of the best harbours in Africa. It was taken by the Spaniards in 1732; and is seated on a rock, near a bay of the Mediterranean, three miles from Oran. Lon. 0. 10 W. Lat. 36. 1 N.

MARSEILLES, a strong city of France, in the department of the Mouths of the Rhone. It was lately an episcopal see; and the inhabitants are computed to be 90,000. It was so celebrated in the time of the Romans, that Cicero styled it the Athens of the Gauls, and Pliny called it the Mistress of Education. It is seated on the Mediterranean, at the upper end of a gulf, covered and defended by many small islands; and it is partly on the declivity of a hill, and partly in a plain. It is divided into the Old Town, or the City, and the New Town. The first appears like an amphitheatre to the vessels which enter the port; but the houses are mean, and the streets dirty, narrow, and steep. In this part is the principal church, built by the Goths, on the ruins of the temple of Diana. The New Town is a perfect contrast to the City, with which it has a communication by one of the finest streets imaginable; and its other streets, the squares, and the public buildings are beautiful. With respect to commerce, Marseilles has been called Europe in Miniature, on account of the variety of dresses and languages which are here seen and heard. The port is a basin of an oval form, 3480 feet long, by 960 in its widest part, with 18 or 20 feet depth of water, and is defended by a citadel and a fort. In 1649 the plague raged with great violence, and with still greater in 1720, when it carried off 50,000 of the inhabitants. The memory of this great calamity is preserved by two pictures, painted by Serre, in the hall of the town-house. In 1793 Marseilles revolted against the French National Convention, but was very soon reduced. It is 13 miles N.W. of Toulon, and 362 S. by E. of Paris. Lon. 5. 27 E. Lat. 43. 18 N.

MARSH, MARS, MAS, are derived from the Saxon meprc, fen (*Gibson*).

MARSH *s.* (meprc, Saxon.) A fen; a bog; a swamp; a watery tract of land (*Drayton*).

MARSH, or SALT MARSH, a pasture found to be particularly favourable to the recovery of sick and lame horses under certain circumstances. The experienced Gibson says, the salt marshes along the river Thames are as good pasture for horses as any about London; and there many horses run all the year round. Though the air arising from the marshes is very injurious to human constitutions, and subjects them to annual returns of the ague, and some other maladies; yet it has no such effect upon brute creatures that feed on them, which may perhaps be owing to the quality of the salts with which that grass is more or less impregnated. The marsh soil is for the most part a composition of a very fine light mould, mixed with sand, covered all over with a fine trefoil, which sows itself and grows extremely thick in some places, as we see it on some parts of our finest commons. If the rains fall never so heavy, the ground being open drinks it up immediately, so that the cattle always lie dry upon it, even in winter, when most other places are potchy, which is one of the greatest benefits of all others to horses at grass. They purge more there, both by dung and urine, than on any other pasture, and afterwards take on a firmer flesh; so that those who send their horses there only to cleanse them, and after purging remove them to other pastures, unless it be for some particular convenience, Gibson says, are greatly mistaken; for he has known horses that have run there summer and winter, with as few accidents as happen to horses any where else. Four-and-twenty hours' constant rain in the grass season will often bring up grass in the marshes, unless the weather be extremely cold. And horses often grow fat on the best marshes when they are eaten so bare, or burnt up in dry weather, that scarcely any grass is to be seen on them. In winter some never house them, but let them run abroad and take their chance in the open fields, where there are neither trees nor hedges to cover them, and yet they seldom suffer any thing from the extremity of the weather; nor, unless the ground be covered deep with snow, do they allow them any dry forage. Yet these for the most

part appear in good case even in the months December and January, when they have nothing to feed on but the roots.

All the water they have to drink is for the most part brackish, which at first is not very agreeable to horses that have not been used to it, but afterwards they relish it as well as any other. The greatest danger on the marsh grounds is from the deep ditches made to take off the spring tides, some of which have their bottoms filled with a mixed substance engendered by the weeds, which makes them still more dangerous.

MARSH (Narcissus), a learned prelate, was born in Wiltshire in 1638, and educated at Magdalen-hall, Oxford. In 1678 he was appointed provost of Dublin college, and in 1682 promoted to the bishopric of Leighlin and Ferns, and after various translations reached the archbishopric of Armagh in 1703. He repaired several decayed churches, and built an alms-house for clergymen's widows. He died in 1713. The archbishop wrote, 1. Institutiones Logicæ in usum Juventutis Academicæ, Dublin, 1681. 2. An Introduction to the Doctrine of Sounds, containing some Proposals for the Improvement of Acoustics, &c.

MARSH (Cinquefoil), in botany. See COMARUM.

MARSH (Elder), in botany. See VIBURNUM.

MARSH (Marigold). See CALTHA.

MARSHAL, or MARESCHAL, *marescallus*, primarily denotes an officer who has the care or the command of horses.

Nicod derives the word from *polemarchus*, master of the camp; Matthew Paris from *Martis senescallus*. In the old Gaulish language, *march* signified horse, whence *marechal* might signify him who commanded the cavalry. Spelman, Skinner, and Menage, derive it from the German *maer*, *marre*, a mare, or even a horse, and *schalt*, servant; which makes some imagine the title was first given to farriers, or those who shod and bled horses; and that, in succession of time, it passed to those who commanded them. Pasquier makes four several derivations for the four several kinds of marshals in use among the French; viz. marshals of France, marshals de camp, marshals de logis, or quarter-masters, and farriers, who are also called by the name of marshals. The third he derives from *marche*, or *marchir*, to mark, limit; and the last from *maire*, master, and *chal*, horse.

Earl Marshal of Scotland.—His office was to command the cavalry, whereas the constable commanded the whole army They seem, however, to have had a sort of joint command, as of old all orders were addressed "to our constable and marischal." The office of earl marischal has never been out of the noble family of Keith. It was reserved at the union; and when the heritable jurisdictions were bought it was in the crown, being forfeited by the rebellion of George Keith, earl marischal, in 1715.

Earl Marshal of England is the eighth great officer of state. This office, until it was made hereditary, always passed by grant from the king, and never was held by tenure or serjeanty (by any subject) as the offices of lord high steward and lord high constable were sometimes held. The title is personal, the office honorary and officiary. They were formerly styled lord marshal only, until king Richard II, June 20, 1397, granted letters patent to Thomas Mowbray, earl of Nottingham, and to the heirs male of his body lawfully begotten, by the name and style of earl marshal; and further, gave them power to bear in their hand a gold truncheon, enamelled with black at each end; having at the upper end of it the king's arms engraven thereon, and at the lower end his own arms.

King James I. was pleased, by letters patent, dated August 29th, 1622, to constitute Thomas Howard, earl of Arundel and Surrey, earl marshal for life; and the next year, the same king granted (with the advice of the privy-council) letters patent, wherein it was declared, that during the vacancy of the office of lord high constable of England, the earl marshal had the like jurisdiction in the court of chivalry as both constable and marshal jointly ever exercised. See CHIVALRY (Court of).

On the 19th of October 1672, king Charles II. was pleased to grant to Henry lord Howard, and the heirs-male of his body lawfully begotten, the office and dignity of earl marshal of England, with power to execute the same by deputy or deputies, in as full and ample a manner as the same was heretofore executed by Henry Howard, lord Maltravers, late earl of Arundel, Surrey, and Norfolk, grandfather to the said Henry lord Howard; or by Thomas Howard late duke of Norfolk, grandfather to the said Thomas Howard, late earl of Arundel, Surrey, and Norfolk; or by Thomas Howard duke of Norfolk, grandfather of the said Thomas Howard duke of Norfolk; or by John Mowbray duke of Norfolk, or any other earl marshal of England; with a pension of 20l. each year, payable out of the Hanaper office in chancery; and on default of the issue-male of the said Henry lord Howard, with limitation to the heirs-male lawfully begotten of the body of the said Thomas Howard, earl of Arundel, &c.; and on the default of such issue to descend in like manner to the heirs-male of Thomas late earl of Suffolk; and, on default of his issue-male, to the heirs-male of lord William Howard, late of Naworth in the county of Cumberland, youngest son to Henry Howard late duke of Norfolk; and on default of his issue-male, to Charles Howard earl of Nottingham, and the heirs-male of his body lawfully begotten.

Field Marshal, an office of high rank in the European armies. It was long, however, disused in the British army, but has lately been revived in the person of his royal highness the duke of York, the duke of Kent, and some other general officers.

Knight Marshal, or *Marshal of the King's House*, an English officer, whose business, ac-

cording to Fleta, is to execute the commands and decrees of the lord steward, and to have the custody of prisoners committed by the court of verge. Under him are six marshal's men, who are properly the king's bailiffs, and arrest in the verge of the court, when a warrant is backed by the board of green-cloth. The court where causes of this king, between man and man, are tried, is called the Marshalsea, and is under the knight marshal.

Marshal signifies farther, 1. The chief officer of arms (*Shakspeare*). 2. An officer who regulates combats in the lists (*Dryden*). 3. Any one who regulates rank or order at a feast, or any other assembly (*Spenser*). 4. A harbinger; a pursuivant (*Sidney*).

To Ma'rshal. *v. a.* (from the noun.) 1. To arrange; to rank in order (*Glanville*). 2. To lead as a harbinger (*Shakspeare*).

MA'RSHALLER. *s.* (from *marshal.*) One that arranges; one that ranks in order (*Trapp*).

MARSHALL (Thomas), an English divine, was born in Leicestershire, about 1621, and bred at Lincoln college, Oxford, but when the university was taken possession of by the parliamentary visitors he went to Rotterdam. After the restoration he became fellow of his college, and took his degree of D.D. He was afterwards rector of Lincoln college, and appointed dean of Gloucester. He died in 1685. His works are, 1. Observationes in Evangeliorum Versiones perantiquas duas, Gothicas scilicet et Anglo Saxonicas; 2. An Explanation of the Catechism; 3. An Epistle prefixed to Dr. Hyde's Translation into the Malayan Language of the four Gospels, and the Acts of the Apostles.

Marshall (Nathanael), an English divine, at the beginning of the eighteenth century, who was chaplain to George II. and published, 1. The works of St. Cyprian, fol. 1717; 2. A Defence of our Constitution in Church and State, 1717, 8vo. His sermons were published by his widow in 1730, in 3 vols. 8vo.

MARSHALLIA, in botany, a genus of the syngenesia polygamia æqualis class and order. Generic character: calyx common, many-leaved, spreading; leaflets linear lanceolate, blunt, concave, almost equal, permanent; corolla compound, uniform, longer than the calyx; stamen filaments five, capillary; pistil germ ovate; pericarpium none; seeds solitary; receptacle chaffy.

MARSHALLING A COAT, in heraldry, is the disposal of several coats of arms belonging to distinct families, in one and the same escutcheon or shield, together with their ornaments, parts, and appurtenances.

MARSHALSEA COURT, is a court of record, originally instituted to hear and determine causes between the servants of the king's household, and others, within the verge; and has jurisdiction of things within the verge of the court, and of pleas of trespass, where either party is of the king's family, and of all other actions personal, wherein both parties are the king's servants; but the court has also power to try all personal actions, as debt, trespass, slander, trover, action on the case, &c. between party and party, within the liberty, which extends twelve miles about Whitehall. The judges of this court are the steward of the king's household, and knight-marshal for the time being; the steward of the court, or his deputy, is generally an eminent counsel. It can try all causes, and sits every week, so that judgment can be obtained in a fortnight or three weeks. It has jurisdiction of all debts above as well as below forty shillings. But if a cause of importance is brought in this court, it is frequently removed into the court of King's Bench, or Common Pleas, by an *habeas corpus cum causa*. This cannot be done unless the debt is above twenty pounds. The court would have a great deal of practice, on account of its expedition, if it were not confined by having only a fixed number of attorneys.

MA'RSHALSHIP. *s.* The office of a marshal.

MARSHAM (Sir John), a learned writer, was born in London in 1602, and educated first at Westminster school, and next at St. John's college, Oxford. He afterwards studied the law, and became one of the six clerks in chancery. In the civil wars he adhered to the royal party, and in 1660 was chosen member of parliament for Rochester. Charles II. conferred on him the honour of knighthood. He died in 1685. He is distinguished for his Diatriba Chronologica, or a Chronological Dissertation, wherein he examines successfully the principal difficulties which occur in the chronology of the Old Testament, 1649, 4to. He afterwards enlarged this work under the following title, Canon Chronicus, Ægyptiacus, Ebraicus, Græcus, & Disquisitiones, 1662, folio.

MARSHFIELD, a town in Gloucestershire, with a market on Tuesday; seated on the Coteswold Hills, 11 miles E. of Bristol, and 102 W. of London. Lon. 2. 15 W. Lat. 51. 30 N.

MARSHLAND, a marshy peninsula in the county of Norfolk, opposite to King's-Lynn, almost surrounded with the Ouse and other navigable rivers, and an arm of the sea. It seems formerly to have been recovered out of the ocean, from whose inundations it could never be altogether defended; and in sir Henry Spelman's time it suffered two general ones, viz. one from the salt-water, the other from the freshes; by the last of which the inhabitants suffered 42,000l. damage. It contains about 30,000 acres, which turn to more profit by grazing than ploughing. It is about ten miles in the widest place, and has no less than 111 brick bridges. The commonage of it belongs to seven villages that surround it. The air was formerly so unhealthy that an ague was in that country called the *Marshland bailiff.* Of late, however, this tract of land has been diligently cultivated, and there is a corresponding improvement in the salubrity of the air.

MARSHMALLOW. See Althæa.

MA'RSHY. *a.* (from *marsh.*) 1. Boggy; wet; fenny; swampy (*Dryden*). 2. Produced in marshes (*Dryden*).

MARSI, a nation of Germany, who afterwards settled in Italy, in a country abounding with wild boars, and other ferocious animals. They are particularly celebrated for the civil war in which they were engaged, and which from them has received the name of the Marsian war.

MARSIGLI (Louis), an Italian, born in 1658, at Bologna. He entered into the imperial army, and served with great reputation; but in 1683 he was taken prisoner by the Tartars, who sold him to the Turks. After suffering much hardship, he was ransomed in 1684, and in 1689 obtained a colonel's commission. He was afterwards advanced to the rank of marshal, but when the count d'Arco was condemned to death for giving up the fortress of Brisac to the duke of Burgundy, Marsigli, who commanded him, was also disgraced, and dismissed the service. He now sought consolation in scientific pursuits, and returned to Bologna, where he formed a museum, and founded a printing-house; the first he gave to the senate, and the last to the Dominicans. He died at Marseilles in 1729. He was a fellow of the Royal Society of London, and member of the Academy of Sciences at Paris. His writings on philosophical subjects are numerous.

MARSI'LEA. In botany, a genus of the class cryptogamia, order musci. Common receptacle oval, coriaceous, many-celled, filled with numerous anthers, and germs. Two species; both exotics.

MARSTON (John), an English dramatic writer, who lived in the time of James I. Wood says he was a student in Corpus Christi college, Oxford; but we neither know his family nor the time of his birth. He contributed eight plays to the stage, which were all acted at Black-friars with applause; and one of them, called the Dutch Courtezan, was once revived since the restoration, under the title of the Revenge, or a Match in Newgate. There is no account when he died; but we find his works were published after his death by Shakspeare, and may thence reasonably conclude that it happened about the year 1614. He was a chaste and pure writer; avoiding all that obscenity, ribaldry, and scurrility, which too many of the dramatists of that time, and indeed much more so in some periods since, have made the basis of their wit, to the great disgrace and scandal of the stage.

MARSYAS, a celebrated piper of Celæne, in Phrygia. He was so skilful in playing on the flute that he is generally deemed the inventor of it. Marsyas was enamoured of Cybele, and he travelled with her as far as Nysa, where he had the imprudence to challenge Apollo to a trial of his skill as a musician. The god accepted the challenge, and it was mutually agreed that he who was defeated should be flead alive by the conqueror. Each exerted his utmost skill, and the victory, with much difficulty, was adjudged to Apollo. The god, upon this, tied his antagonist to a tree, and flead him alive. Marsyas is often represented on monuments as tied, his hands behind his back, to a tree, while Apollo stands before him with his lyre in his hands. At Celæne the skin of Marsyas was shown to travellers for some time; it was suspended in the public place in the form of a bladder or a foot-ball. (*Hygin. Ovid.* &c.)—2. A river of Phrygia, which, it is said, had its source from the abundant tears of the Fauns, Satyrs, and Druids, at the fall of Marsyas the musician.

MARSUPIAL. (*marsupialis.*) Shaped like a bag, or purse.

MARSUPIALIS, (*marsupialis, musculus*; from *marsupium*, a purse, so named from its resemblance.) In anatomy. See OBTURATOR INTERNUS.

MART, denotes a great fair or market, held annually for the buying and selling goods. There is a mart of this kind at Lynn every February, which lasts about a fortnight. This is followed by one at Wisbech, of nearly equal duration.

MARTABAN, a city of Asia, and capital of a country subject to the king of Ava, who took it from Pegu. It was a long time the capital of an independent kingdom. The soil is fertile, and the climate represented as healthy. This city was once a seaport, and one of the most flourishing commercial towns in the east, being situated on the side of a bay or large river near the Bay of Bengal, that afforded a good harbour for ships of the largest size; but after the king of Ava had conquered the country, he caused a number of vessels, laden with stones, to be sunk in its mouth, so that it is now only navigable for small vessels. The chief trade is now in earthenware and fish: 115 miles S.S.E. Pegu. Lon. 98. 2 E. Lat. 16. 38 N.

MARTAGON LILY, in botany. See LILIUM.

MARTEN, in ornithology. See HIRUNDO.

MARTHA, (St.) a province of Terra Firma, in South America, having the North Sea on the N. Rio de la Hache on the E. New Granada on the S. and Carthagena on the W. It is about 300 miles long, and 200 broad. Here the Cordillera de los Andes begin, which run the whole length of South America. This country, on the sea-coast, is exceedingly hot, but farther inland very cold, notwithstanding its situation within the torrid zone.

MARTHA, (St.) the capital of the above province, is situated in a wholesome air near the sea. Lon. 74. 0 W. Lat. 11. 27 N.

MARTHA, (St.) an exceeding high mountain of New Spain. According to some travellers it is about 100 miles in circumference at the base, near 5 miles high, and always covered with snow. Lon. 73. 55 W. Lat. 8. 0 N.

MARTHA'S VINEYARD, an island of North America near the coast of New-England, 80 miles south of Boston. The inhabitants apply themselves chiefly to their fisheries, in which they have great success. Lon. 70. 35 W. Lat. 41. 0 N.

MA'RTIAL. *a.* (*martial*, Fr. *martialis*, Lat.) 1. Warlike; fighting; given to war; brave (*Spenser. Chapman*). 2. Having a war-

like show; suiting war (*Pope*). 3. Belonging to war; not civil (*Bacon*). 4. Borrowing qualities from the planet Mars (*Brown*). 5. Having parts or properties of iron, which is called *Mars* by the chemists.

MARTIAL LAW, is the law of war that depends upon the mere arbitrary will and pleasure of the king, or his lieutenant: for though the king doth not make any laws but by common consent in parliament, yet, in time of war, by reason of the necessity of it to guard against dangers that often arise, he useth absolute power, so that his word is a law. (*Smith de Repub. Ang. lib.* 2. *c.* 4.) But the martial law, according to chief justice Hale, is in reality not a law, but something indulged rather than allowed as a law; and it relates only to members of the army, being never intended to be executed on others, who ought to be ordered and governed by the laws to which they are subject, though it be a time of war. And the exercise of martial law, whereby any person might lose his life, or member, or liberty, may not be permitted in time of peace, when the king's courts are open for all persons to receive justice.

MARTIALES LUDI, games celebrated at Rome in honour of Mars.

MARTIALIS (Marcus Valerius), a native of Spain, came to Rome about the 20th year of his age, where he recommended himself by his poetical genius. As he was the panegyrist of the emperors, he gained the greatest honours, and Domitian gave him the tribuneship; but unmindful of the favours he received after the death of his benefactor, he exposed the vices of a monster, whom, in his lifetime, he had extolled as the pattern of virtue. Trajan treated the poet with coldness, who, after he had passed 35 years in Rome in the greatest splendour, retired to his native country, where he became the object of malevolence and ridicule. He died about the 104th year of the Christian era, in the 75th year of his age. He is now well known by the fourteen books of epigrams which he wrote, and whose merit is now best described by the candid confession of the author in this line,

Sunt bona, sunt quædam mediocria, sunt mala plura.

The Editio Princeps of Martial is supposed to have been printed about the year 1470. It is in 4to, and is a work of extreme scarcity and great price. Of the Aldine editions of 1510—17, the curious set a great value on the first, some very few copies of which were struck off on vellum. Radius's folio edition of 1602 is very valuable. The excellent edition of Scriverius, L. Bat. Duod. 1619. Amst. 1650, contains, besides the notes of that learned editor, those of Joseph Scaliger, Brodæus, Adrian Turnebus, Politian, Lipsius, Rutgersius, and Pontanus. Smidsius's edition published in 8vo. at Amsterdam, in 1701, is very valuable. The last edition we have seen is the Bipont edit. of 1784, in 2 vols. 8vo. It is formed on Scriverius's, corrected by Schrevelius, and collated with those of Raderus and Farnabus. In the first volume there is a life of Martial by Raderus.

MA'RTIALIST. *s.* (from *martial.*) A warriour; a fighter (*Howel*).

MARTIN, or MARTLET, in mastiology. (See MUSTELA.) An animal inhabiting woods and bushy coverts, rather inferior in size to a domestic cat, but longer in the neck and body, having a head and tail corresponding in make and shape with the fox, but not so sharp-pointed in the ears. It is nearly as expert in climbing trees, and leaping from one to another, as a squirrel; breeds in the hollows of trees, and produces four, five, and even six, young at a time: lives upon poultry, game, and birds. These animals by their great agility in climbing become a most destructive enemy to pheasants, and by their scent they are frequently the subject of much mortifying disappointment to a field of expectant sportsmen. When found admist the bushes, the general burst of the finding hounds is as great as when a fox is unkenneled, and so continues, till, being closely pressed, some friendly tree (probably clothed with ivy) suddenly terminates the chase, by affording the martlet an asylum.

MARTIN, in ornithology. See HIRUNDO.

MARTIN (Benjamin), an eminent artist and good mathematician, was born in 1704. After publishing a variety of ingenious treatises, and particularly a scientific magazine under his own name, and carrying on for many years a very extensive trade as an optician and globe-maker in Fleet-street, the growing infirmities of age compelled him to withdraw from the active part of business. Trusting too fatally to what he thought the integrity of others, he unfortunately, though with a capital more than sufficient to pay all his debts, became a bankrupt. The unhappy old man, in a moment of desperation from this unexpected stroke, attempted to destroy himself; and the wound, though not immediately mortal, hastened his death, which happened February 9th, 1782, in his 78th year. He had a valuable collection of fossils and curiosities of almost every species; which, after his death, were almost given away by public auction. His principal publications, as far as they have occurred to recollection, are, The Philosophic Grammar; being a View of the present State of Experimental Physiology, or Natural Philosophy, 1735, 8vo. A new, complete, and universal System or Body of Decimal Arithmetic, 1735, 8vo. The Young Student's Memorial Book, or Patent Library, 1735, 8vo. Description and Use of both the Globes, the Armillary Sphere and Orrery, Trigonometry, 1736, 2 vols. 8vo. Memoirs of the Academy of Paris, 1740, 5 vols. System of the Newtonian Philosophy, 1759, 3 vols. New Elements of Optics, 1759. Mathematical Institutions, viz. Arithmetic, Algebra, Geometry, and Fluxions, 1759. Natural History of England, with a Map of each County, 1759, 2 vols. Philology, and Philosophical Geography, 1759. Mathematical Institutions, 1764, 2 vols. Lives of Philosophers, their Inventions, &c. 1764. Introduction to the New-

tonian Philosophy, 1765. Institutions of Astronomical Calculations, 2 parts, 1765. Description and Use of the Air-Pump, 1766. Description of the Torricellian Barometer, 1766. Appendix to the Description and Use of the Globes, 1766. Philosophia Britannica, 1778, 3 vols. Gentleman and Lady's Philosophy, 2 vols. Miscellaneous Correspondence, 4 vols. System of Philology. Philosophical Geography. Magazine complete, 14 vols. Principles of Pump-work. Theory of the Hydrometer. Doctrine of Logarithms.

MARTIN (St.), a town of France, in the isle of Rhe, with a harbour and strong citadel, 15 miles west of Rochelle. Lon. 1. 17 W. Lat. 46. 10 N.

MARTIN (St.), one of the Leeward Caribbean islands, in the West Indies, lying to the north-west of St. Bartholomew, and to the south-west of Anguilla. It is 24 miles in circumference, has neither harbour nor river but several salt-pits. It was long jointly possessed by the French and Dutch; but at the commencement of the present war, the former were expelled by the latter. Lon. 63. 0 W. Lat. 18. 4 N.

MARTIN (Cape), a promontory of Valencia in Spain, near a town called Denia, and separates the Gulph of Valencia from that of Alicant.

MARTIN (Free), in zoology, is a name given in this country to a cow-calf cast at the same time with a bull-calf, which is a kind of hermaphrodite that is never known to breed nor to discover the least inclination for the bull, nor does the bull ever take the least notice of it. See HERMAPHRODITE.

MARTINGAL, in the manage, a thong of leather fastened at one end of the girths under the belly of a horse, and at the other end to the muscroll to keep him from rearing.

MARTINI (Raymond), a learned orientalist of the 13th century. He was a native of Spain, and entered among the dominicans. He wrote a famous book against the Jews, called Pugio Fidei, which was not printed till 1651.

MARTINI (Martin), a jesuit, who resided many years in China, of which country he wrote many curious memoirs. He returned to Europe in 1651, and published a description of China, with a map of that empire. It is said that he went back thither, and died at Hang-Chew at the age of 74.

MARTINICO, one of the Windward Caribbee Islands, 60 miles in length, and 100 in circumference. The French possessed it from 1635 till 1762, when it was taken by the English; it was restored in 1763, and again taken by the English in 1794: but restored to France again by the treaty of peace in 1801. There are many high mountains covered with trees, as well as several rivers and fertile vallies, but they will not bear either wheat or vines; however, the former is not much wanted, for the natives prefer cassava to wheat bread. It produces sugar, cotton, ginger, indigo, chocolate, aloes, pimento, plantains, and other tropical fruits; and is extremely populous. In 1770 it contained 12,450 white people, 1814 free mulattoes, 70,553 slaves, and 443 fugitive negroes. About the same time, its products were computed at 23 million pounds of sugar, 600,000 of cotton, and 40,000 of cocoa. It has several safe and commodious harbours, well fortified. St. Pierre is the capital.

MA'RTINMAS. *s.* (*Martin* and *mass.*) The feast of St. Martin; the eleventh of November, commonly corrupted to *martilmas* or *martlemas* (*Tusser*).

MARTLETS, in heraldry, little birds represented without feet, and used as a difference or mark of distinction for younger brothers.

MARTNETS, in a ship, small lines fastened to the leech of a sail, reeved through a block on the topmast-head, and coming down by the mast to the deck. Their use is to bring the leech of the sail close to the yard to be furled.

MARTORANO, a town of Naples, in Calabria Citeriore, with a bishop's see, eight miles from the sea, and 15 S. of Cosenza. Lon. 16. 20 E. Lat. 39. 6 N.

MARTOREL, a town of Spain, in Catalonia, seated at the confluence of the Noya and Lobragal, 18 miles N W. of Barcelona. Lon. 1. 56 E. Lat. 41. 36 N.

MARTOS, a town of Spain, in Andalusia, with a fortress on a rock, eight miles S. of Anduxar.

MARTYNIA, in botany, a genus of the class didynamia, order angiospermia. Calyx five-cleft; corol ringent; capsule woody, covered with a bark, with a hooked beak, four-celled, two-valved. Four species: three of South America; one of the Cape; herbaceous, flowering plants.

MARTYR, is one who lays down his life, or suffers death, for the sake of his religion. The word is Greek, μαρτυρ, and properly signifies a witness. It is applied, by way of eminence, to those who suffer in witness of the truth of the gospel.

The Christian church has abounded in martyrs, and history is filled with surprising accounts of their singular constancy and fortitude under the most cruel torments human nature was capable of suffering. The primitive Christians were accused by their enemies of paying a sort of divine worship to the martyrs. Of this we have an instance in the answer of the church of Smyrna to the suggestion of the Jews, who, at the martyrdom of Polycarp, desired the heathen judge not to suffer the Christians to carry off his body, lest they should leave their crucified master, and worship him in his stead. To which they answered, "We can neither forsake Christ, nor worship any other: for we worship him as the Son of God; but love the martyrs as the disciples and followers of the Lord, for the great affection they have shown to their king and master." A like answer was given at the martyrdom of Fructuosus in Spain. For when the judge asked Eulogius, his deacon, whether he would not worship Fructuosus? as thinking, that though he refused to worship the heathen idols, he might yet be inclined to worship a Christian martyr; Eulogius replied,

been greatly blamed for her severity towards Mary. This unhappy princess was extremely beautiful and accomplished.

MARY, queen of England, daughter of king Henry VIII. and Catherine of Arragon, was born on the 18th of February, 1515. On her father's marrying Anne Boleyne, she was declared illegitimate. After the death of Edward VI. in 1553, lady Jane Grey was proclaimed queen of England, but Mary promising that no change should be made in religion, obtained the crown, and some time after, lady Jane, with the lord Dudley, and other persons of quality, were beheaded. Soon after Mary's accession to the throne, she married Philip II. afterwards king of Spain, son of the emperor Charles V. who was then living, and in violation of the most sacred promises, began a dreadful persecution of the Protestants, which was carried on by Bonner, bishop of London, and Gardiner, bishop of Winchester. Great numbers of persons suffered martyrdom at the stake; among which were Cranmer, Ridley, Latimer, Hooper, and Ferrer; and all the prisons in the kingdom were crowded with those pious sufferers, who submitted to persecution rather than violate their consciences. Even the princess Elizabeth was closely watched, and obliged to conceal her religious sentiments. Amidst these dreadful proceedings, Mary was far from being happy; a continual disagreement with her husband, who was younger than she, and of whom she was passionately fond, with the loss of Calais, which was taken by the French, threw her into a complication of distempers, of which she died without issue, the 17th of November, 1558, in the forty-fourth year of her age, after a bloody reign of five years, four months, and eleven days, and was succeeded by Elizabeth.

MARY II. queen of England, was the eldest daughter of James II. king of England, by his first wife the lady Anne Hyde, and was born at St. James's the 10th of May, 1662. On the 15th of November, 1677, she married William-Henry of Nassau; went into Holland with her husband, who was made stadtholder of the United Provinces, and staid there till 1689, when after the abdication of king James, she returned to England, and on the 11th of April was crowned queen, and her husband king of England, by the name of William III. She endeared herself to the people by the wisdom of her conduct, and during the absence of king William, had the administration of affairs, which she conducted very ably. She died of the small-pox at Kensington palace, Dec. 28th, 1694.

MARY MAGDALEN'S DAY, a festival of the Romish church, observed annually on the 22d of July.

MARY LE BONE. See MARIBONE.

MARYBOROUGH, a borough of Ireland, capital of Queen's County, 17 miles south of Philipstown. Lon. 7. 0 W. Lat. 53. 2 N.

MARYGOLD, in botany. See CALENDULA.

MARYGOLD (Corn). See CHRYSANTHEMUM.

MARYGOLD (French). See TAYGETES.

MARYLAND, one of the United States of America, 134 miles long and 110 broad; bounded on the N. by Pennsylvania, on the E. by the state of Delaware, on the S.E. and S. by the Atlantic ocean, and on the S. and W. by Virginia. It is divided into 18 counties, 10 of which are on the western, and eight on the eastern shore of the Chesapeak. The number of inhabitants is about 320,000, of whom 103,000 are slaves. Wheat and tobacco are the staple commodities of this state, which, in most respects, resembles Virginia. Anapolis is the capital.

MARY'S RIVER (St.), a river of the United States, in Georgia. It is navigable for vessels of considerable burden for ninety miles; and its banks afford immense quantities of fine timber suited to the West India markets. It forms a part of the southern boundary of the United States, and enters Amelia Sound, in lat. 30. 44 N.

MARY'S STRAIT (St.), a strait in North America, which forms the communication between lake Superior and lake Huron. It is about 40 miles long; and at the upper end is a rapid fall, which, when conducted by careful pilots, may be descended without danger.

MARYPORT, a seaport of Cumberland, with a harbour capable of great improvement. In 1750 it was only a poor fishing town; but it has now upward of 3000 inhabitants, who employ about 90 vessels, from 50 to 250 tons burden, in the coal or coasting trade. It is situate at the mouth of the Ellen, on the coast of the Irish sea, nine miles N.W. of Cockermouth. Lon. 3. 32 W. Lat. 54. 45 N.

MARZA SIROCCO, a gulf on the S. side of the isle of Malta. The Turks landed here in 1565, when they went to besiege Valetta; for which reason the grand master ordered three forts to be built, two at the entrance of the gulf, and one on the point of land that advances into the middle of it.

MARZILLA, a town of Spain, in the province of Navarre, seated near the river Arragon, 30 miles S of Pampeluna.

MAS PLANTA. See MASCULINE FLOWER.

MASAFUERO, an island in the S. Pacific Ocean, about 90 miles W. of Juan Fernandez. It is very high and mountainous, and at a distance appears like one hill or rock. It is of a triangular form, and about 25 miles in circumferenee. Lon. 80. 46 W. Lat. 33. 45 S.

MASARIS, in entomology, a Fabrician tribe of the genus VESPA, which see.

MASBATE, one of the Philippine islands, almost in the centre of the rest. It is 75 miles in circumference, and the natives are tributary to the Spaniards. Lon. 122. 25 E. Lat. 11. 36 N.

MASBOTHÆI, or MESBOTHÆI, the name of a sect, or rather of two sects; for Eusebius, or rather Hegesippus whom he cites, makes mention of two different sects of Masbothæans. The first was one of the seven sects

that arose out of Judaism, and proved very troublesome to the church; the other was one of the seven Jewish sects before the coming of Jesus Christ. The word is derived from the Hebrew שבת, *schabat*, to rest or repose, and signifies idle, easy, indolent people. Eusebius speaks of them as if they had been so called from one Masbothæus, their chief: but it is much more probable that their name is Hebrew, or at least Chaldaic, signifying the same thing with a Sabbatarian in our language; that is, one who makes profession of keeping sabbath. Valesius will not allow the two sects to be confounded together: the last being a sect of Jews before, or at least contempary with Christ: and the former a sect of heretics descended from them. Rufinus distinguishes them in their names: the Jewish sect he calls Masbuthæi; and the heretics Masbuthæani. The Masbutheans were a branch of the Simonians.

MASBROUGH, a village in Yorkshire, on the river Don, adjoining the bridge of Rotherham. Here are considerable iron works, where all sorts of hammered and cast iron goods are made, from the most trifling article to a large cannon, of which great quantities are exported.

MASCATE, a town of Arabia Felix, in the province of Oman. It has a castle on a rock, and is very strong both by nature and art, though the buildings are mean. It was fortified, in 1650, by the Portuguese; but afterwards taken by the Arabs, who put all the garrison to the sword, except eighteen, who turned Mahometans. The cathedral, built by the Portuguese, is now the king's palace. There are neither trees, shrubs, nor grass to be seen on the seacoast near it, and only a few date-trees in a valley at the back of the town, though they have all things in plenty. The weather is so hot from May to September, that no people are to be seen in the streets from ten in the morning till four in the afternoon. The bazars or market-places are covered with the leaves of date-trees, laid on beams which reach from the house tops on one side to those on the other. The religion of the inhabitants is Mahometanism, and yet, contrary to the custom of the Turks, they suffer any one to go into their mosques. The products of the country are horses, dates, fine brimstone, coffee, and ruinoss, a root that dyes red. Mascate is seated at the bottom of a small bay of the Arabian sea, 68 miles S.E. of Oman. Lon. 57. 26 E. Lat. 24. 0 N.

MASCHARADA. A term applied by the Italians to music composed for the gestures of mimics, buffoons, and grotesque characters.

MA'SCULINE. *a.* (*musculin*, Fr.). 1. Male; not female (*Milton*). 2. Resembling man; virile; not soft; not effeminate (*Add.*). 3. (In grammar.) It denotes the gender appropriated to the male kind in any word.

MASCULINE FLOWER. (*masculus flos*). In botany, a male or barren flower.

MA'SCULINELY. *ad.* Like a man (*B. Jonson*).

MA'SCULINENESS. *s.* (from *masculine.*) Mannishness; male figure or behaviour.

MASH. *s.* (*masche*, Dutch.) 1. The space between two threads of a net; commonly written mesh (*Mortimer*). 2. (from *mischen*, Dutch, or *mascher*, Fr.). Any thing mingled or beaten together into an undistinguished or confused body.

MASH, a kind of diet-pudding sometimes given to a horse. It is made of half a peck of ground malt, put into a pail, into which as much scalding water is poured as will wet it very well. When that is done, stir it about till by tasting you find it as sweet as honey; and when it has stood till it is luke-warm, it is to be given to the horse. This is mostly used after a purge, to make it work the better; or after hard labour; or in the time of sickness. Mashes are made with bran in the same manner. Taplin recommends two thirds of the former, to one of the latter.

To MASH. *v. a.* (*mascher*, French.) 1. To beat into a confused mass (*More*). 2. To mix malt and water together in brewing (*Mortimer.*)

MASHANGUR, a town of Hindustan Proper, in the province of Cabul, situate on the Seward, 48 miles N. of Attock, and 130 E.S.E. of Cabul. Lon. 71. 7 E. Lat. 33. 54 N.

MASINISSA, a king of a small part of Africa, who assisted the Carthaginians in their wars against Rome. He proved a most indefatigable and courageous ally, but an act of generosity rendered him amicable to the interests of Rome. After the defeat of Asdrubal, Scipio found, among the prisoners, one of the nephews of Masinissa. He sent him back to his uncle loaded with presents, and conducted him with a detachment for the safety and protection of his person. Masinissa was struck with this generous action, he forgot all former hostilities, and joined his troops to those of Scipio. This change of sentiments was not the effect of a wavering or unsettled mind, but Masinissa shewed himself the most attached and the firmest ally the Romans ever had. He afterwards rendered many services to the Romans, and his fidelity was at length rewarded with the kingdom of Syphax, and some of the Carthaginian territories. Masinissa died in the 97th year of his age, after a reign of above 60 years, 149 years before the Christian era. He left 54 sons, three of whom were legitimate, Micipsa, Gulussa, and Manastabal. The kingdom was fairly divided among them by Scipio, whom he had appointed as their guardian, and the illegitimate children received, as their portion, very valuable presents. The death of Gulussa and Manastabal soon after left Micipsa sole master of the large possessions of Masinissa.

MASK. *s.* (*masque*, French.) 1. A cover to disguise the face; a visor. (See MASQUE.) 2. Any pretence or subterfuge (*Prior*). 3. A festive entertainment in which the company is masked (*Shakspeare*). 4. A revel; a piece of mummery (*Milton*). 5. A dramatic performance, written in a tragic style, without attention to rules or probability (*Peacham*).

MASK. An utensil called by the Latins

persona, from the verb *personare*, to sound through; and which was used by the ancient Roman actors and singers. It was generally formed with a wide mouth in the shape of a shell, for the purpose of augmenting the power of the voice, upon the principle of the speaking trumpet.

To MASK. *v. a.* (*masquer*, French.) 1. To disguise with a mask or visor (*Hooker*). 2. To cover; to hide (*Crashaw*).

To MASK. *v. n.* 1. To revel; to play the mummer (*Prior*). 2. To be disguised any way.

MASKED CORAL, in botany. See PERSONATE.

MASKELYNE'S ISLES, a group of small beautiful islands, in the South Pacific ocean, lying off the S.E. point of Malicollo, one of the New Hebrides.

MA'SKER. *s.* (from *mask.*) One who revels in a mask; a mummer (*Donne*).

MA'SLIN. *a.* (corrupted from *miscellane.*) Composed of various kinds.

MASLACH. A medicine of the opiate kind, in use amongst the Turks.

MASON, a person employed under the direction of an architect, in the raising of a stone-building. The chief business of a mason is to make the mortar; raise the walls from the foundation to the top, with the necessary retreats and perpendiculars; to form the vaults, and employ the stones as delivered to him. When the stones are large, the business of hewing or cutting them belongs to the stone-cutters, though these are frequently confounded with masons: the ornaments of sculpture are performed by carvers in stones or sculptors. The tools or implements principally used by them are the square, level, plumb-line, bevel, compass, hammer, chissel, mallet, saw, trowel, &c. (See SQUARE, &c.) Besides the common instruments used in the hand, they have likewise machines for raising of great burdens, and the conducting of large stones: the principal of which are the lever, pulley, wheel, crane, &c. (See LEVER, &c.)

MASONS (Free and Accepted), a very ancient society or body of men: so called, either from some extraordinary knowledge of masonry or building, which they are supposed to be masters of, or because the first founders of the society were persons of that profession. These are now very considerable, both for number and character, being found in every country in Europe, and consisting principally of persons of merit and consideration. As to antiquity, they lay claim to a standing of some thousand years. What the end of their institution is, seems still in some measure a secret; and they are said to be admitted into the fraternity by being put in possession of a great number of secrets, called the *mason's word*, which have been religiously kept from age to age, being never divulged. See FREE-MASONRY.

MASON (William), an eminent poet and distinguished scholar, was born at Hull, where his father possessed the vicarage of St. Trinity. Where he received his school education we have not been able to learn. At the proper time he was admitted into St. John's college, Cambridge; where he took the degree of B. A. and M. A., and in 1747 he obtained a fellowship in Pembroke-hall. It was there that he contracted an intimate friendship with Gray the poet, and with Mr. Hurd, now bishop of Worcester. When the former of these gentlemen died, Mr. Mason took upon himself the office of editor of his works and guardian of his fame; and upon the promotion of the latter to the see of Lichfield and Coventry, he expressed his satisfaction in some beautiful verses.

In 1754 he entered into holy orders, and was patronised by the then earl of Holderness, who obtained for him the appointment of chaplain to the king, and presented him with the valuable rectory of Aston in Yorkshire. He was some time afterwards made precentor of York cathedral, when he published a small volume of church music, which has alternately met with opposition and applause. In our opinion some of his anthems are unrivalled.

It was natural for the precentor of a cathedral church, who was likewise a poet, to turn his attention to sacred music; and Mason had been a poet from his early years. His Elfrida and Caractacus, two tragedies on the Grecian model, were both published before the year 1757. These two dramas, in the opinion of Dr. Hurd, do honour to modern poetry, and are, according to him, a sufficient proof of the propriety of reviving the chorus on the British stage. In this sentiment few critics, we believe, will agree with his lordship; but the tragedies have certainly great merit, and transcend perhaps every poem of the same cast in our own or any other modern tongue. In the first, the language is elegant and sweet; in the latter, it is daring and sublime. The author himself always considered the former as the most perfect; and Johnson, whose critical judgment will not be rashly questioned, seems to have been of the same opinion.

Besides his two tragedies, Mr. Mason published many other poems. His English Garden is universally read and admired, being unquestionably the finest poem of the kind that has appeared since the days of Thomson; though some have affected to consider it as treating the subject rather with professional skill than with poetical genius. That there are in it a few prosaic expressions we shall not controvert; for such seem inseparable from didactic poetry: but, taken as a whole, where shall we find its equal? His elegies, particularly that on the death of his wife, and that on the demise of lady Coventry, have been generally read and extolled, though not more than they deserve, as superior in classical elegance to any thing of the kind in the English tongue, and expressing a manliness and tenderness of the pathetic, rarely found in the most polished elegies of Roman writers. The splendour of genius, and accuracy of judgment, conspicuous in his dramas, are equally displayed in his character as a lyric writer. His quarry was bold and impetuous, and he never swept the ground with an ignominious flight. In his Sappho

and Phaon he has happily imitated the style of Dryden and Metastasio; and at his death he was employed on a poem in which he proposed to measure his strength with Dryden.

It is said, we know not how truly, that this ingenious man was the inventor of the fashionable instrument the piano-forte.

Poetry and music, and the duties of his office, might be supposed to have employed all his time; but he caught the alarm which in 1769 was spread over the nation by the expulsion of Mr. Wilkes from the House of Commons, and immediately enrolled himself among the supporters of the Bill of Rights.

Being leagued with the opposition, he joined in the application for a parliamentary reform. In the year 1779, when the city of London, and some other commercial towns, agreed to present their petition to parliament for a more economical expenditure of the public money, and a more equal representation of the people, Mr. Mason came forward and took an active part in promoting these designs, as one who was convinced of their importance and necessity. Yet he shewed, by his subsequent conduct, that however earnestly he might wish for what he doubtless considered as an expedient reform in the commons-house of Parliament, he was firmly attached to the British constitution. He was indeed a whig; but he was a whig of the old school: and thus, like many others of the same principles, became alarmed at the dreadful encroachments made upon real liberty in the progress of the French revolution.

The death of this great and good man, which happened in April 1797, was occasioned neither by age nor by inveterate disease. As he was stepping into his chariot his foot slipped, and his shin grazed against the step. This accident had taken place several days before he paid the proper attention to it; and on April the 3d a mortification ensued, which in the space of 48 hours put a period to his life.

MASONRY, in general, a branch of architecture, consisting in the art of hewing or squaring stones, and cutting them level or perpendicular, for the uses of building: but in a more limited sense, masonry is the art of assembling and joining stones together with mortar.

Masonry (Free), denotes the system of mysteries and secrets peculiar to the society of free and accepted masons. The origin of this society is very ancient; but we have no authentic account of the time when it was first instituted, or even what was the reason of such an association of people under the title of Masons, more than of any other mechanical profession. In Dr. Henry's history we find the origin of the Free Mason's Society in Britain attributed to the difficulty found in former times of procuring a sufficient number of workmen to build the multitude of churches, monasteries, and other religious edifices which the superstition of those ages prompted the people to raise. Hence the masons were greatly favoured by the popes, and many indulgences were granted in order to augment their numbers. In times like those we speak of, it may well be supposed that such encouragement from the supreme pastors of the church must have been productive of the most beneficial effects to the fraternity; and hence the increase of the society may naturally be deduced. The doctor quotes, in confirmation of this, the words of an author who was well acquainted with their history and constitution. "The Italians (says he), with some Greek refugees, and with them French, Germans, and Flemings, joined into a fraternity of architects, procuring papal bulls for their encouragement and their particular privileges; they styled themselves Freemasons, and ranged from one nation to another, as they found churches to be built: their government was regular; and where they fixed near the building in hand they made a camp of huts. A surveyor governed in chief; every tenth man was called a warden and overlooked each nine. The gentlemen in the neighbourhood, either out of charity or commutation of penance, gave the materials and carriages. Those who have seen the accounts in records of the charge of the fabrics of some of our cathedrals near 400 years old, cannot but have a great esteem for their economy, and admire how soon they erected such lofty structures."

By other accounts, however, the antiquity of masonry is carried up much higher, even as early as the building of Solomon's temple. In Britain the introduction of masonry has been fixed at the year 674, when glass-making was first introduced; and it appears indeed, that from this time many buildings in the Gothic style were erected by men in companies, who are said to have called themselves free, because they were at liberty to work in any part of the kingdom. Others have derived the institution of freemasons from a combination among the people of that profession not to work without an advance of wages, when they were summoned from several counties, by writs of Edward III. directed to the sheriffs, to assist in rebuilding and enlarging the castle, together with the church and chapel of St. George, at Windsor. At this time, it is said, the masons agreed on certain tokens by which they might know and assist each other against being impressed, and not to work unless free and on their own terms.

In the Supplement to the Encyclopædia Britannica, we have the following account of the origin of Freemasonry. "Much falsehood is current respecting the origin and antiquity of the masonic associations. That the Dionysiacs of Asia Minor were a society of architects and engineers, who had the exclusive privilege of building temples, stadia, and theatres, under the mysterious tutelage of Bacchus, seems to be unquestionable. We are also certain that there was a similar trading association during the dark ages in Christian Europe, which monopolized the building of great churches and castles, and enjoyed many privileges under the patronage of the various sovereigns. Circumstances (says Dr. Robison), which it would be

tedious to enumerate and discuss, continued this association longer in Britain than on the continent; but there is no good evidence that, anterior to the year 1648, any man sought admission into it, who was not either a builder by profession, or at least skilled in the science of architecture. At that period, indeed, Mr. Ashmole, the famous antiquary, was admitted into a lodge at Warrington, together with his father-in-law colonel Mainwaring: and these are the first distinct and unequivocal instances that we have in Britain of men unconnected with the operative masons being received into their mysterious fraternity. The secrecy, however, of the lodges, made them fit places for the meetings of the royalists; and accordingly many royalists became freemasons. Nay, the ritual of the master's degree seems to have been formed, or perhaps twisted from its original institution, so as to give an opportunity of sounding the political principles of the candidate, and of the whole brethren present. For it bears so easy an adaptation to the death of the king, to the overturning of the venerable constitution of the English government of three orders by a mean democracy, and its re-establishment by the efforts of the loyalists, that this would start into every person's mind during the ceremonial, and could hardly fail to shew, by the countenances and behaviour of the brethren, how they were affected.

"This supposition receives much countenance from the well known fact that Charles II. was made a mason, and frequented the lodges. It is not unlikely, that besides the amusement of a vacant hour, which was always agreeable to him, he had pleasure in meeting with his loyal friends, and in the occupations of the lodge, which recalled to his mind their attachment and services. His brother and successor James II. was of a more serious and manly cast of mind, and had little pleasure in the frivolous ceremonies of masonry. He did not frequent the lodges. But, by this time, they were the resort of many persons who were not of the profession, or members of the trading corporation. This circumstance, in all probability, produced the denominations of free and accepted masons. A person who has the privilege of working at any incorporated trade is said to be a freeman of that trade. Others were accepted as brethren, and admitted to a kind of honorary freedom; as is the case in many other trades and incorporations, without having (as far as we can learn for certain) a legal title to earn a livelihood by the exercise of it.

"It was not till some years after this period that the lodges made open profession of the cultivation of general benevolence, and that the grand aim of the fraternity was to enforce the exercise of all the social virtues. The establishment of a fund for the relief of unfortunate brethren did not take place till the very end of the last century; and we may presume that it was brought about by the warm recommendations of some benevolent members, who would naturally enforce it by addresses to their assembled brethren. Hence the probable origin of those philanthropic discourses which are occasionally delivered in the lodges by one of the brethren as an official task.

"The boasted philanthropy of masons serves, however, another purpose. The inquisitive are always prying and teazing, eager to discover the secrets of their neighbours; and hence the brethren are induced to say, that universal beneficence is the great aim of the order, for it is the only point on which they are at liberty to speak. They forget that universal beneficence and philanthropy are inconsistent with the exclusive and monopolizing spirit of an association, which not only confines its benevolence to its own members (like any other charitable association), but hoards up in its bosom inestimable secrets, whose natural tendency, they say, is to form the heart to this generous and kind conduct, and inspire us with love to all mankind. The profane world cannot see the beneficence of concealing from public view a principle or a motive which so powerfully induces a mason to be good and kind. The brother says, that publicity would rob it of its force; and we must take him at his word: and our curiosity is so much the more excited, to learn what are the secrets which have so singular a quality, for they must be totally unlike the principles of science, which produce their effects only when made public.

"From this account of masonry, it would appear to have been at first a loyal association, and as such it was carried over from England to the continent; for all the masons abroad profess to have received their mysteries from Great Britain. It was first transported into France by the zealous adherents of king James, who, together with their unfortunate master, took refuge in that country; and it was cultivated by the French in a manner suited to the taste and habits of that highly polished and frivolous people. To the three simple British degrees of apprentice, fellow-craft, and master, they gradually added degrees innumerable, all decorated with stars and ribbons; and into their lodges they introduced the impieties and seditious doctrines of Voltaire and the other philosophists." The English freemasons, however, as a body, are perfectly free from the charge of promulgating either seditious or irreligious opinions.

MASORA, a term in the Jewish theology, signifying a work on the Bible, performed by several learned rabbins, to secure it from any alterations which might otherwise happen.

Their work regards merely the letter of the Hebrew text; in which they have, first, fixed the true reading by vowels and accents: they have, secondly, numbered not only the chapters and sections, but the verses, words, and letters of the text: and they find in the Pentateuch 5245 verses, and in the whole Bible 23,206. The masora is called, by the Jews, the hedge or fence of the law, because this enumeration of the verses, &c. is a means of preserving it from being corrupted and altered. They have, thirdly, marked whatever irregu-

larities occur in any of the letters of the Hebrew text; such as the different size of the letters, their various positions and inversions, &c. and they have been fruitful in finding out reasons for these irregularities and mysteries in them. (See CABBALISTS). They are, fourthly, supposed to be the authors of the Keri and Chetibh, or the marginal corrections of the text in our Hebrew Bibles.

There is a great and a little masora printed at Venice and at Basil, with the Hebrew text in a different character. Buxtorf has written a masoretic commentary, which he calls Tiberias. See on this subject Jennings's Jewish Ant. vol. i. p. 400, &c. and the various authors there cited.

MASORITES, Jewish doctors, authors of the Masora. According to Elias Levita, they were the Jews of a famous school at Tiberias, about 500 years after Christ, who composed, or at least began the masora; whence they are called masorites, and masoretic doctors. Aben Ezra makes them the authors of the points and accents in the Hebrew text, as we now find it; and which serve for vowels. See POINTS.

The age of the masorites has been much disputed. Archbishop Usher places them before Jerom; Capel at the end of the fifth century; father Morin in the tenth century: Basnage says, that they were not a society, but a succession of men; and that the masora is the work of many grammarians, who, without associating and communicating their notions, composed this collection of criticisms on the Hebrew text. It is urged that there were masorites from the time of Ezra and the men of the great synagogue, to about the year of Christ 1030; and that Ben Asher and Ben Naphtali, who were the best of the profession, and who, according to Basnage, were the inventors of the masora, flourished at this time.—Each of these published a copy of the whole Hebrew text, as correct, says Dr. Prideaux, as they could make it. The eastern Jews have followed that of Ben Naphtali, and the western that of Ben Asher; and all that has been done since is to copy after them, without making any more corrections or masoretical criticisms.

MASOVIA, a province of Poland, containing the two Palatinates of Czerk or Masovia Proper, and Polotsk. By the dismemberment of this kingdom it was annexed to Prussia. Warsaw is the chief city.

MASQUE, or MASK, a cover for the face, contrived with apertures for the eyes and mouth; originally worn chiefly by women of condition, either to preserve their complexion from the weather, or out of modesty to prevent their being known. Poppæa, wife of Nero, is said to be the first inventor of the masque; which she did to guard her complexion from the sun and weather, as being the most delicate woman, with regard to her person, that has been known. Theatrical masques were in common use both among the Greeks and Romans: Suidas and Athenæus ascribe the invention of them to the poet Choerilus, a contemporary of Thespis; Horace attributes them to Æschylus; but Aristotle informs us that the real inventor, and consequently the time of their first introduction and use, were unknown. Brantome observes, that the common use of modern masques was not introduced till towards the end of the 16th century.

MASQUE. A musical drama chiefly consisting of singing, machinery, and dancing. Masques, which preceded the regular or legitimate drama, required such splendid and expensive decorations, that they were necessarily at first confined to the palaces of princes, and the mansions of the nobility. Those of Ben Jonson, Beaumont and Fletcher, sir William Davenant, Milton, and others, originally appeared in that manner, and seem, indeed, to have been written for particular occasions.

MASQUE is also used to signify any thing made use of to cover the face, and prevent a person's being known The penitents of Lyons and Avignon hide their faces with large white veils, which serve them for masques.

The IRON MASQUE (*Masque de Fer*), or Man with the iron masque, a remarkable personage so denominated, who existed as a state prisoner in France during the latter part of the last century. As the circumstances of this person form a historical problem which has occasioned much inquiry, and given rise to many conjectures, as well as of late, in consequence of the destruction of the Bastile, excited in a particular manner the curiosity of the public, it shall be endeavoured to condense in this article the substance of every thing material that has been published on the subject. We shall first relate such particulars concerning this extraordinary prisoner as appear to be well authenticated; and shall afterwards mention the different opinions and conjectures that have been entertained with regard to his real quality, and the causes of his confinement.

I. The authenticated particulars concerning the Iron Masque are as follows:—A few months after the death of cardinal Mazarine, there arrived at the isle of Sainte Marguerite, in the sea of Provence, a young prisoner whose appearance was peculiarly attracting: his person was above the middle size, and elegantly formed; his mien and deportment were noble, and his manners graceful; and even the sound of his voice, it is said, had in it something uncommonly interesting. On the road he constantly wore a mask made with iron springs, to enable him to eat without taking it off. It was at first believed that this masque was made entirely with iron; whence he acquired the name of "the Man with the iron mask." His attendants had received orders to dispatch him if he attempted to take off his masque or discover himself. He had been first confined at Pigneol, under the care of the governor M. de St. Mars; and upon being sent from thence to St. Marguerite, he was accompanied thither by the same person, who continued to have the charge of him. He was always treated with the most marked respect: he was served constantly in plate; and the governor himself placed his dishes on the table, retiring immediately after,

and locking the door behind him. He *tu-to'yoit* (thee'd and thou'd) the governor; who, on the other hand, behaved to him in the most respectful manner, and never wore his hat before him, nor sat down in his presence unless he was desired. The Marquis de Louvoisis, who went to see him at St Marguerite, spoke to him standing, and with that kind of attention which denotes high respect.

During his residence here, he attempted twice, in an indirect manner, to make himself known. One day he wrote something with his knife on a plate, and threw it out of his window towards a boat that was drawn on shore near the foot of the tower. A fisherman picked it up and carried it to the governor. M de St. Mars was alarmed at the sight; and asked the man with great anxiety, whether he could read, and whether any one else had seen the plate? The man answered, that he could not read, that he had but just found the plate, and that no one else had seen it. He was, however, confined till the governor was well assured of the truth of his assertions.—Another attempt to discover himself proved equally unsuccessful. A young man who lived in the isle one day perceived something floating under the prisoner's window; and on picking it up, he discovered it to be a very fine shirt written all over. He carried it immediately to the governor; who, having looked at some parts of the writing, asked the lad, with some appearance of anxiety, if he had not had the curiosity to read it? He protested repeatedly that he had not: but two days afterwards he was found dead in his bed.

The Masque de Fer remained in this isle till the year 1698, when M. St. Mars being promoted to the government of the Bastile, conducted his prisoner to that fortress. In his way thither, he stopt with him at his estate near Palteau. The Masque arrived there in a litter, surrounded by a numerous guard on horseback. M. de St. Mars eat at the same table with him all the time they resided at Palteau: but the latter was always placed with his back towards the windows; and the peasants, who came to pay their complements to their master, and whom curiosity kept constantly on the watch, observed that M. de Mars always sat opposite to him with two pistols by the side of his plate. They were waited on by one servant only, who brought in and carried out the dishes, always carefully shutting the door both in going out and returning. The prisoner was always masked, even when he passed through the court; but the people saw his teeth and lips, and also observed that his hair was grey. The governor slept in the same room with him, in a second bed that was placed in it on that occasion. In the course of their journey, the iron mask was, one day, heard to ask his keeper whether the king had any design on his life? "No, Prince," he replied; "provided that you quietly allow yourself to be conducted, your life is perfectly secure."

The stranger was accommodated as well as it was possible to be in the Bastile. An apartment had been prepared for him by order of the governor before his arrival, fitted up in the most convenient style; and every thing he expressed a desire for was instantly procured him. His table was the best that could be provided; and he was ordered to be supplied with as rich clothes as he desired: but his chief taste in this last particular was for lace, and for linen remarkably fine. It appears that he was allowed the use of such books as he desired, and that he spent much of his time in reading. He also amused himself with playing upon the guitar. He had the liberty of going to mass; but was then strictly forbid to speak or uncover his face: orders were even given to the soldiers to fire upon him if he attempted either; and their pieces were always pointed towards him as he passed through the court. When he had occasion to see a surgeon or a physician, he was obliged, under pain of death, constantly to wear his mask. An old physician of the Bastile, who had often attended him when he was indisposed, said, that he never saw his face, though he had frequently examined his tongue, and different parts of his body; that there was something uncommonly interesting in the sound of his voice; and that he never complained of his confinement, nor let fall from him any hint by which it might be guessed who he was. It is said that he often passed the night in walking up and down his room.

This unfortunate prince died on the 19th of November 1703, after a short illness; and was interred next day in the burying-place of the parish of St. Paul. The expence of his funeral amounted only to forty livres. The name given him was *Marchiali*: and even his age, as well as his real name, it seemed of importance to conceal; for in the register made of his funeral, it was mentioned that he was about forty years old; though he had told his apothecary, some time before his death, that he thought he must be sixty. It is a well known fact, that immediately after the prisoner's death, his apparel, linen, clothes, matresses, and in short every thing that had been used by him, were burnt; that the walls of his room were scraped, the floor taken up, evidently from the apprehension that he might have found means of writing any thing that would have discovered who he was. Nay such was the fear of his having left a letter or any mark which might lead to a discovery, that his plate was melted down; the glass was taken out of the window of his room, and pounded to dust; the window-frame and doors burnt; and the ceiling of the room, and the plaster of the inside of the chimney, taken down. Several persons have affirmed, that the body was buried without a head; and M. de St. Foix informs us, that "a gentleman having bribed the sexton, had the body taken up in the night, and found a stone instead of the head."

The result of these extraordinary accounts is, that the Iron Masque was not only a person of high birth, but must have been of great con-

sequence; and that his being concealed was of the utmost importance to the king and ministry.

Various are the conjectures and opinions that have been formed respecting the real name and condition of this remarkable personage. Some have pretended that he was the duke of Beaufort; others, that he was the count de Vermandois, natural son to Louis XIV. by the duchess de la Valliere. Some maintain him to have been the duke of Monmouth, natural son of Charles II. of England by Lucy Walters; and others say, that he was Gerolami Magni, minister to the duke of Modena.

Besides these conjectures, none of which possesses sufficient probability to entitle them to consideration, a fifth has been advanced: namely, That the Iron Masque was a son of Anne of Austria, queen to Louis XIII. and consequently that he was a brother of Louis XIV.; but whether a bastard brother, a brother-german, or a half brother, is a question which has not yet been decided. And as the difficulty of the enquiry increases with the lapse of time, it is probable the doubts which hang about this mysterious subject will never be removed.

MASQUERADE, or MASCARADE, an assembly of persons masqued or disguised, meeting to dance and divert themselves. This was much in use with us, and has been long a very common practice abroad, especially in carnival time. The word comes from the Italian *mascarata*, and that from the Arabic *mascara*, which signifies raillery, buffoonery. Granacci, who died in 1543, is said to have been the first inventor of masquerades.

To MASQUERA'DE. *v. n.* (from the noun.) 1. To go in disguise (*L'Estrange*). 2. To assemble in masks (*Swift*).

MASQUERA'DER. *s.* (from *masquerade.*) A person in a mask (*L'Estrange*).

MASRAKITHA, a pneumatic instrument of music among the ancient Hebrews, composed of pipes of various sizes, fitted into a kind of wooden chest, open at the top, and stopped at the bottom with wood covered with a skin. Wind was conveyed to it from the lips, by means of a pipe fixed to the chest: the pipes were of lengths musically proportioned to each other, and the melody was varied at pleasure, by stopping and unstopping with the fingers the apertures at the upper extremity.

MASS. *s.* (*masse*, French; *massa*, Latin.) 1. A body; a lump; a continuous quantity (*Newton*). 2. A large quantity (*Davies*). 3. Bulk; vast body (*Abbot*). 4. Congeries; assemblage indistinct (*Dryden*). 5. Gross body; the general (*Dryden*).

To MASS. *v. n.* (from the noun.) To celebrate mass (*Hooker*).

MASS, in mechanics, the matter of any body cohering with it. *i. e.* moving and gravitating along with it. In which sense mass is distinguished from bulk, or volume, which is the expansion of a body in length, breadth, and thickness. The mass of any body is rightly estimated by its weight. And the masses of two bodies of the same weight are in a reciprocal ratio of their bulks.

MASS, *Missa*, in the church of Rome, the office or prayers used at the celebration of the eucharist; or in other words consecrating the bread and wine into the body and blood of Christ, and offering them so transubstantiated as an expiatory sacrifice for the quick and the dead.

As the mass is in general believed to be a representation of the passion of our blessed Saviour, so every action of the priest, and every particular part of the service, is supposed to allude to the particular circumstances of his passion and death.

Nicod, after Baronius, observes that the word comes from the Hebrew *missach*, (*oblatum*;) or from the Latin *missa missorum*; because in the former times the catechumens and excommunicated were sent out of the church when the deacons said, *Ite, missa est*, after sermon and reading of the epistle and gospel; they not being allowed to assist at the consecration. Menage derives the word from *missio*, dismissing: others from *missa*, missing, sending; because in the mass, the prayers of men on earth are sent up to heaven.

The general division of masses consists in high and low. The first is that sung by the choristers, and celebrated with the assistance of a deacon and sub-deacon: low masses are those in which the prayers are barely rehearsed without singing.

There are a great number of different or occasional masses in the Romish church, many of which have nothing peculiar but the name: such are the masses of the saints; that of St. Mary of the snow, celebrated on the fifth of August; that of St. Margaret, patroness of lying-in women; that of the feast of St. John the Baptist, at which are said three masses; that of the Innocents, at which the gloria in excelsis and the hallelujah are omitted, and it being a day of mourning the altar is of a violet-colour. As to ordinary masses, some are said for the dead, and, as is supposed, contribute to fetch the soul out of purgatory: at these masses the altar is put in mourning, and the only decorations are a cross in the middle of six yellow wax lights; the dress of the celebrant, and the very mass-book, are black; many parts of the office are omitted, and the people are dismissed without the benediction.

MASSA. (*massa*, μαζα; from μασσω, to blend together). In medicine, a term generally applied to the compound out of which pills are to be formed.

MASSA CARNEA JACOBI SYLVII. In anatomy. See FLEXOR LONGUS DIGITORUM PEDIS.

MASSA, an ancient and strong town of Italy, the capital of a district of the same name, which is famous for its quarries of fine marble. It is 55 miles W. by N. of Florence. Lat. 44. 0 N. Lon. 10. 0 E.

Massa, an episcopal town of the Siennese, in Italy, 25 miles S. W. of Sierra. Lat. 42 40 N. Lon. 10. 48 E.

Massa, an episcopal town of Terra di Lavoro, in Naples, Italy. It is 20 miles S. of Naples. Lat. 40. 31 N. Lon. 14. 18 E.

MASSACHUSETTS, one of the United States of America, bounded on the north by the states of Vermont and New Hampshire, on the east by the Atlantic, on the south by the Atlantic and the states of Connecticut and Rhode Island, and on the west by the state of New York; about 120 miles from east to west, and about forty-five, in general, from north to south, though towards the eastern extremity it is much more. Massachusetts was originally a part of New England, and first separated in the year 1627. In Massachusetts are to be found all the varieties of soil, from very good to very bad, capable of yielding all the different productions common to the climate, such as Indian corn, wheat, rye, barley, oats, hemp, flax, hops, potatoes, field beans and peas; apples, pears, peaches, plums, cherries, &c. Iron ore in immense quantities is found in various parts of this state, as likewise copper ore, black lead, pipe-maker's clay, yellow and red ochre, alum, slate, or stone, ruddle, or a red earth, and in some places asbestos, or incombustible cotton. Several mineral springs have been found in different parts of the country. Massachusetts is divided into eleven counties, which contain 265 towns, the principal of which are Boston and Salem. The number of inhabitants, in the year 1790, was 378,787; they are now upwards of 400,000. This state owns more than three times as many tons of shipping as any other of the states, and more than one-third part of the whole that belongs to the United States. At this period 35,000 tons are employed in carrying on the fisheries; 56,000 in the coasting business, and 120,500 in trading with almost all parts of the world. Pot and pearl-ashes, staves, flax, seed, bees-wax, &c. are carried chiefly to Great Britain, in remittance for their manufactures; masts and provisions to the East Indies; fish, oil, beef, pork, lumber, candles, &c. are carried to the West Indies, for their produce; and the two first articles, fish and oil, to France, Spain, and Portugal; roots, vegetables, fruits, and small meats, to Nova Scotia and New Brunswick; hats, saddlery, cabinet-work, men's and women's shoes, nails, tow, cloth, barley, hops, butter, cheese, &c. to the southern states. The negro-trade was prohibited by law in 1778, and there is not a single slave belonging to the commonwealth.

Massachusetts Bay, a bay of North America, which spreads eastward of Boston, and is comprehended between Cape Ann on the north, and Cape Cod on the south. It is so denominated, as well as the whole state, from a tribe of Indians of the same name that formerly inhabited the country round the bay.

MASSACRE. (*massacre*, French.) 1. Butchery; indiscriminate destruction (*Dryden*). 2. Murder (*Shakspeare*).

To Ma'ssacre. *v. a.* (*massacrer*, French.) To butcher; to slaughter indiscriminately (*Atterbury*).

MASSAFRA, an episcopal town of Naples, in Italy. Lat. 40. 50 N. Lon. 17. 20 E.

MASSAGETÆ, an ancient people, about whose seat there is as much doubt as about that of the Amazons: Tibullus and Ammion place them near Albania, beyond the Araxes, which sometimes denotes the Oxus: it is probable they dwelt to the east of Sogdiana. (*Dionysius Perigetes, Herodotus, Arrian*).

MASSALIANS, a set of enthusiasts who sprang up about the year 361, in the reign of the emperor Constantius, who maintained that men have two souls, a celestial and a diabolical, and that the latter is driven out by prayer.

MASSETER. (*masseter*, μασσητηρ; from μασσαομαι, to chew, because it assists in chewing.) A muscle of the lower jaw, situated on the side of the face. It is a short thick muscle, which arises, by fleshy and tendinous fibres, from the lower edge of the malar process of the maxillary bone, the lower horizontal edge of the os malæ, and the lower edge of the zygomatic process of the temporal bone, as far backwards as the eminence belonging to the articulation of the lower jaw. From some little interruption in the fibres of this muscle, at their origin, some writers describe it as arising by two, and others by three distinct portions, or heads. The two layers of fibres of which it seems to be composed cross each other as they descend, the external layer extending backwards, and the internal one slanting forwards. It is inserted into the basis of the coronoid process, and into all that part of the lower jaw which supports the coronoid and condyloid processes. Its use is to raise the lower jaw, and, by means of the above mentioned decussation, to move it a little forwards and backwards in the act of chewing.

MASSICOT. See Masticot.

MASSILIA, in ancient geography, a town of Gallia Narbonensis, a colony of Phoceans, from Phocæa, a city of Ionia, and in confederacy with the Romans, universally celebrated, not only for its port, commerce, and strength, but especially for its politeness of manners, and for its learning. According to Strabo, it was the school for barbarians, who were excited by its means to a fondness for Greek literature, so that even their public and private transactions were all executed in that language. Strabo adds, "At this day the noblest Romans repair thither for study rather than to Athens." Now Marseilles.

MASSILLON (Jean Baptiste), son of a notary at Hieres in Provence, was born in 1663, and entered into the congregation of the Oratory in 1681. He gained the affections of every person in the towns to which he was sent, by the charms of his genius, the liveliness of his character, and by a fund of the most delicate and affecting politeness. His first attempts in the art of eloquence were made at

Vienne, while he was professor of theology. His funeral oration on Henry de Villars, archbishop of that city, received universal approbation. This success induced father de la Tour, who was at that time general of the congregation, to call him to Paris. Here the superiority of his eloquence was clearly perceived when he appeared at court. Upon preaching his first advent sermon at Versailles, he received this eulogium from the mouth of Louis XIV. "Father, when I hear others preach, I am very well pleased with them; but whenever I hear you I am dissatisfied with myself." The first time he preached his famous sermon "on the small number of the elect," the whole audience were, at a certain place of it, seized with a sudden and violent emotion, and almost every person half rose from his seat, by a kind of involuntary movement.

In 1704 Massillon made his second appearance at court, and displayed still more eloquence than before. Louis XIV. after expressing his satisfaction to him, added, in the most gracious tone of voice, *Et je veux, mon pere, vous entendre tous les deux ans.* These flattering encomiums did not lessen his modesty. When one of his fellows was congratulating him upon his preaching admirably, according to custom, "Oh! give over, father (replied he), the devil has told me so already, much more eloquently than you."

Massillon was admitted into the French academy a year afterwards, in 1719. The abbacy of Savigny becoming vacant, the cardinal du Bois, to whom he had been weak enough to give an attestation for being a priest, procured it for him. The funeral oration of the duchess of Orleans, in 1723, was the last discourse he pronounced in Paris. He never afterwards left his diocese, where his gentleness, politeness, and kindness, had gained him the affection of all who knew him. He reduced the exorbitant rights of the episcopal roll to moderate sums. In two years he caused 20,000 livres to be privately conveyed to the Hotel Dieu of Clermont. His peaceable disposition was never more displayed than while he was a bishop. He took great pleasure in collecting the fathers of the Oratory and the Jesuits at his country-house, and in making them join in some diversion. He died on the 28th of September 1742, at the age of 79.

An excellent edition of Massillon's works was published by his nephew at Paris in 1745 and 1746, in 14 vols. large 12mo. and 12 vols. of a small size.—Among them we find, 1. Complete sets of sermons for Advent and Lent. It is particularly in his moral discourses, such as are almost all those of his sermons for Advent and Lent, that Massillon's genius appears. He excels, says M. d'Alembert, in that species of eloquence which alone may be preferred to all others, which goes directly to the heart, and which agitates without wounding the soul. He searches the inmost recesses of the heart, and lays open the secret workings of the passions, with so delicate and tender a hand, that we are hurried along rather than overcome. His diction, which is always easy, elegant, and pure, every where partakes of that noble simplicity, without which there can be neither good taste nor true eloquence; and this simplicity is, in Massillon, joined to the most attractive and the sweetest harmony, from which it likewise borrows new graces. In short, to complete the charm produced by this enchanting style, we perceive that these beauties are perfectly natural; that they flow easily from this source, and that they have occasioned no labour to the composer. There even occur sometimes in the expressions, in the turns, or in the affecting melody of the style, instances of negligence which may be called happy, because they completely remove every appearance of labour. By thus abandoning himself to the natural current of thought and expression, Massillon gained as many friends as hearers. He knew that the more anxious an orator appears to raise admiration, he will find those who hear him the less disposed to bestow it. 2. Several funeral orations, discourses, and panegyrics, which had never been published. 3. Ten discourses, known by the name of Petit Careme. 4. The Conferences Ecclesiastiques, which he delivered in the seminary of St. Magloire upon his arrival at Paris; those which he delivered to the curates of his diocese; and the discourses which he pronounced at the head of the synods which he assembled every year. 5. Paraphrases on several of the Psalms. A translation of several of Massillon's sermons was published in 1803, in 3 vols. 12mo. by Mr. W. Dickson.

A circumstance recorded by D'Alembert proves how dear the memory of Massillon was, not only to the poor whose tears he wiped away, and whose wants he removed, but to all who knew him. Some years after the prelate died, a traveller passing through Clermont wished to see the country-house in which he used to spend the greatest part of the year, and he applied to an old vicar, who, since the death of the bishop, had never ventured to return to that country-house, where he who had inhabited it was no longer to be found. He consented, however, to gratify the desire of the traveller, notwithstanding the profound grief he expected to suffer in revisiting a place so dear to his remembrance. They accordingly set out together, and the vicar pointed out every particular place to the stranger. "There," said he, with tears in his eyes, "is the alley in which the excellent prelate used to walk with us; there is the arbour in which he used to sit and read; this is the garden he took pleasure in cultivating with his own hands." Then they entered the house, and when they came to the room where Massillon died, "This," said the vicar, "is the place where we lost him:" and as he pronounced these words he fainted. The ashes of Titus, or of Marcus Aurelius, might have envied such a tribute of regard and affection.

MA'SSINESS. MA'SSIVENESS. *s.* (from *massy, massive.*) Weight; bulk; ponderousness (*Hakewill*).

MASSINGER (Philip), an English dramatic writer, was born at Salisbury in 1585, and was educated at Oxford, but left the university without taking a degree, and devoted himself wholly to the muses. He published fourteen plays of his own, and some in which he was assisted by others. His works have been reprinted in 1761, in four vols. 8vo. and in 1779, and lately by W. Gifford, esq. He died in 1639.

MA'SSIVE. MA'SSY. *a.* (*massif*, Fr.) Heavy; weighty; ponderous; bulky; continuous (*Dryden*).

MASSON (Papirius), a French writer, born in 1544. He entered among the Jesuits, but afterwards left the society, and became a lawyer. He died in 1611. Masson wrote four books of Annals, in Latin, 1598, 4to. and several other works.

MASSON (John), a French protestant divine, who died in Holland, whither he had fled on the revocation of the edict of Nantes. His works are, 1. Histoire Critique de la Republique des Lettres, fifteen vols. 12mo.; 2. Vitæ Horatii Ovidii et Plinii junioris; 3. Histoire de Pierre Bayle et de ses Ouvrages, Amst. 1716, 12mo.

MASSONIA, in botany, a genus of the class hexandria, order monogynia. Corol inferior with a six-parted border; filaments inserted in the neck of the tube; capsule three-winged, three-celled, many-seeded. Four species; bulbous rooted plants of the Cape.

MASSOY CORTEX. See CORTEX.

MASSUAH, or MATSUAH, a small island in the Red Sea, near the coast of Abyssinia, with an excellent harbour, and water deep enough for ships of any size to the very edge of the island: here they may ride in the utmost security, from whatever point, or with whatever degree of strength, the wind blows. As it takes its modern, so it received its ancient name from its harbour; it was called by the Greeks Sebasticum Os, from the capacity of its port, which is distributed into three divisions. The island itself is very small, scarcely three quarters of a mile in length, and about half that in breadth, one-third occupied by houses, one by cisterns to receive the rain-water, and the last is reserved for burying the dead Lon. 56. 58 E. Lat. 15. 42 N.

MAST. *s.* (*mast*, *mat*, Fr. mæꞅꞇ, Saxon.) 1. The beam or post raised above the vessel, to which the sail is fixed (*Dryden*). 2. The fruit of the oak and beech. It has in this sense no plural termination (*Bacon*).

MAST, a long round piece of timber, elevated perpendicularly upon the keel of a ship, upon which are attached the yards, the sails, and the rigging, in order to their receiving the wind necessary for navigation. A mast, according to its length, is either formed of one single piece, which is called a pole-mast, or composed of several pieces joined together, each of which retains the name of mast separately A top-mast is raised at the head or top of the lower-mast, through a cap, and supported by the trestle-trees. It is composed of two strong bars of timber, supported by two prominences, which are as shoulders on the opposite sides of the masts, a little under its upper end; athwart these bars are fixed the cross-trees, upon which the frame of the top is supported. Between the lower mast-head and the foremost of the cross-trees a square space remains vacant, the sides of which are bounded by the two trestle-trees. Perpendicularly above this is the foremost hole in the cap, whose after-hole is solidly fixed on the head of the lower-mast. The top-mast is erected by a tackle, whose effort is communicated from the head of the lower-mast to the foot of the top-mast, and the upper end of the latter is accordingly guided into and conveyed up through the holes between the trestle-trees and the cap, as before mentioned; the machinery by which it is elevated, or, according to the sea-phrase, swayed up, is fixed in the following manner. The top-rope, passing through a block which is hooked on one side of the cap, and afterwards through a hole, furnished with a sheave or pulley on the lower end of the top-mast, is again brought upwards on the other side of the mast, where it is at length fastened to an eye-bolt in the cap, which is always on the side opposite to the top-block. To the lower end of the top-rope is fixed the top-tackle, the effort of which being transmitted to the top-rope, and thence to the heel of the top-mast, necessarily lifts the latter upwards parallel to the lower mast. When the top-mast is raised to its proper height, the lower end of it becomes firmly wedged in the square hole (above described) between the trestle-trees. A bar of wood or iron, called the fid, is then thrust through a hole in the heel of it, across the trestle-trees, by which the whole weight of the top-mast is supported. See SHIPBUILDING.

Mr. George Smart, of Ordnance wharf, Westminster, obtained a patent in the year 1800, for framing masts, yards, bowsprits, &c. hollow, so as to combine lightness with strength. The idea of this gentleman, though not new, as is well known to those who are conversant with the theory of the strength and stress of materials, is certainly ingenious, and will, we hope, be duly encouraged.

MA'STED. *a.* (from *mast.*) Furnished with masts.

MA'STER. *s.* (*meester*, Dutch; *maistre*, Fr.) 1. One who has servants: opposed to man or servant (*Shakspeare*). 2. A director; a governour (*Ecclus*). 3. Owner; proprietor (*Dryden*). 4. A lord; a ruler (*Guardian*). 5. Chief; head (*Shakspeare*). 6. Possessor (*Addison*). 7. Commander of a trading ship (*Ascham*). 8. One uncontrolled (*Shakspeare*). 9. An appellation of respect (*Shakspeare*). 10. A young gentleman (*Dryden*). 11. One who teaches; a teacher (*South*). 12. A man eminently skilful in practice or science (*Davies*). 13. A title of dignity in the universities: as, *master* of arts.

To MA'STER. *v. a.* (from the noun.) 1. To be a master to; to rule; to govern (*Shakspeare*). 2. To conquer; to overpower (*Calamy*). 3. To execute with skill (*Bacon*).

Master and servant, a relation founded in convenience, whereby a man is directed to call in the assistance of others, where his own skill and labour will not be sufficient to answer the cares incumbent upon him. For the several sorts of servants, and how that character is created or destroyed, see the article Servant. Where a servant is hired for one year certain, and so from year to year as long as both parties shall agree, and the servant enters upon a second year, he must serve out that year, and is not merely a servant at will after the first year. If a woman-servant marries she must nevertheless serve out her term; and her husband cannot take her out of her master's service.

If a servant is disabled in his master's service by an injury received through another's default, the master may recover damages for loss of his service. And also a master may not only maintain an action against any one who entices away his servant, but also against the servant; and if without any enticement a servant leaves his master without just cause, an action will lie against another who retains him with a knowledge of such departure.

A master has a just right to expect and exact fidelity and obedience in all his lawful commands; and to enforce this he may correct his servant in a reasonable manner, but this correction must be to enforce the just and lawful commands of the master.

In defence of his master a servant may justify assaulting another; and though death should ensue it is not murder, in case of any unlawful attack upon his master's person or property.

Acts of the servant are, in many instances, deemed acts of the master; for as it is by indulgence of law that he can delegate the power of acting for him to another, it is just he should answer for such substitute, and that his acts being pursuant to the authority given him should be deemed the acts of his master. 4 Bac. Abr. 583. If a servant commits an act of trespass by command or encouragement of his master, the master will be answerable; but in so doing his servant is not excused, as he is bound to obey the master in such things only as are honest and lawful.

If a servant of an innkeeper robs his master's guest, the master is bound to make good the loss. Also, if a waiter at an inn sells a man bad wine, by which his health is impaired, an action will go against the master: for his permitting him to sell it to any person is deemed and implied general command. 1 Black. 430. In like manner if a servant is frequently permitted to do a thing by the tacit consent of his master, the master will be liable, as such permission is equivalent to a general command.

If a servant is usually sent upon trust with any tradesman, and he takes goods in the name of his master upon his own account, the master must pay for them: and so likewise if he is sent sometimes on trust, and other times with money. for it is not possible for the tradesman to know when he comes by the order of his master, and when by his own authority, or when with and without money. 1 Str 506. But if a man usually deals with his tradesmen himself, or constantly pays them ready money, he is not answerable for what his servant may take up in his name; for in this case there is not, as in the other, any implied order to trust him. Or if the master never had any personal dealings with the tradesman, but the contracts have always been between the servant and the tradesman, and the master has regularly given his servant money for payment of every thing had on his account, the master shall not be charged. Esp. N. P. 115. Or if a person forbids his tradesmen to trust his servant on his account, and he continues to purchase upon credit, he is not liable. The act of a servant, though he has quitted his master's service, has been held to be binding upon the master, by reason of the former credit given him on his master's account, and it not being known to the party trusting that he was discharged. 4 Bac. Abr. 586.

The master is also answerable for any injury arising by the fault or neglect of his servant when executing his master's business, 6 T. R. 659: but if there is no neglect or default in the servant the master is not liable. Esp. Rep. 533.

If a smith's servant lames a horse whilst shoeing him, or the servant of a surgeon makes a wound worse, in both these cases an action for damages will lie against the master, and not against the servant. But the damage must be done while the servant is actually employed in his master's service, otherwise he is liable to answer for his own misbehaviour or neglect.

A master is likewise chargeable if his servant casts any dirt, &c. out of the house into the common street; and so for any other nuisance occasioned by his servants, to the damage or annoyance of any individual, or the common nuisance of his majesty's people. Lord Raym. 264.

A servant is not answerable to his master for any loss which may happen without his wilful neglect; but if he is guilty of fraud or gross negligence an action will lie against him by his master.

A master is not liable in trespass for the wilful act of his servant; as by driving his master's carriage against another, done without the direction or assent of his master, no person being in the carriage when the act was done. But he is liable to answer for any damage arising to another from the negligence or unskilfulness of his servant acting in his employ. M'Manus v. Crickitt, Mich. 41 G. III.

Master of arts, is the first degree taken up in foreign universities, and for the most part in those of Scotland, but the se-

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We trust we shall not be accused of pedantry in coining this term to supply what has appeared to us a palpable vacancy in natural history, and a vacancy which no other term is so well able to fill up. We have formed it in perfect analogy with the correlative terms that classify the animal kingdom, and we are confident it will be found useful. The Greek compounds of μαστος, would justify us in writing either mastology, or mastiology: but the former is perhaps best, as most consonant with various terms already in use in anatomy and medicine, derived from the same source, as mastoidæus and mastodynia.

Thus explained mastology comprises the first class in the Linnéan zoology, and consists of the following orders,

Primates,	Pecora,
Bruta,	Belluæ,
Feræ,	Cete:
Glires,	

and is thus characterized classifically. Lungs respiring alternately: jaws incumbent, covered; teeth usually within; teats lactiferous; organs of sense, tongue, nostrils, eyes, ears, and papillæ of the skin; covering, hair which is scanty in warm climates, and hardly any on aquatics; supporters four, feet, or feet and hands except in aquatics; tail mostly; walk mostly on the earth and speak. In much of the external and internal structure they resemble each other: the chief of them are quadrupeds, as this word was formerly used to express hands as well as feet, and inhabit the surface of the earth. The largest, though fewest in number, inhabit the ocean.

The ordinal characters are taken from the number, situation and structure of the teeth; which is all that is necessary to observe in this article; these characters being given at length under the different terms describing the orders as above.

It must appear to the most superficial observer, from this brief and general statement, that nothing can be more loose and distant than the chain by which many of the genera and even of the orders of this class are connected together: a class that includes tribes varying as widely as possible in their degree of intelligence, in their general shape and appearance, in their habits and manners, and in the element in which they live: a class that extends from the man to the mouse, and unites the horse with the whale. Not however that we are much disposed to find fault with the arrangement on this account, for the different species, genera and orders run so much into each other, that although we are startled at the extreme points, we do not know where to terminate the individual gradations, shade is so continually softening into shade, and link so connected even by nature with link: but we mention the fact to shew the difficulty of acquiring any thing like perfection in any classification whatever. The general and the particular rules of nature being so intervolved as to prevent all hope upon this subject; and to urge this important reflexion upon our readers, that artificial systems of all kinds are not laws of God but mere helps to man: they are of high use in enabling him to acquire knowledge, but they perpetually show him his weakness by compelling him to have recourse to such auxiliary means.

The Linnéan classification, however, chiefly on account of its combining such discrepant materials, has been objected to by many physiologists, who have endeavoured, but perhaps only endeavoured, to improve upon it; and even this rather by a re-modelling of the orders than by any infringement upon the genera. We can notice but two of these arrangements, that of M. Cuvier, and that of M. Blumenbach.

The former divides the genera constituting the same class and under the same name into three orders from the form of the feet; a clawed or nailed; a hoofed; and a finned.

The claw or nail-footed consists of six families as follows:

I. Bimanum (Man alone).
II. Quadrumana.
III Sarcophaga.
IV. Rodentia.
V. Edentata.
VI. Tardigrada.

Of these the first three families are described as having three sorts of teeth; and the last three as wanting one, at least, of these three sorts of teeth.

The hoof-footed class consists of the following three families:

VII. Pachidermata.
VIII. Ruminantia.
IX. Solipeda.

The fin-footed class consists of two families only; which are as follow:

X. Amphibia.
XI. Cetacea.

In Blumenbach we find little more than the families of Cuvier converted directly into orders, which are ten in number, and are arrang as follows:

I. Bimanum.
II. Quadrumana.
III. Bradypoda.
IV. Cheiroptera (Bat only).
V. Glires.
VI. Feræ.
VII. Solidungula (Horse and ass only).
VIII. Pecora or Bisulca.
IX. Belluæ.
X. Cetacea.

As we shall have occasion to return to these systems in the article ZOOLOGY, we think it unnecessary to give more than this brief outline of them at present.

In the class before us man perceives his best friends, and his most formidable enemies. The dog, the horse, the cow, the cat, the sheep, the ass, the mule, and the elephant, are the principal favourites and most useful assistants that mankind find among the inferior tribes. The wolf,

the lion, the tyger, the river-horse, make the most obstinate resistance to his authority as the lord of the lower creation; and notwithstanding his superior cunning and address, and his opposing the strength and activity of numbers to their single and irregular exertions, frequently give him the most mortifying proofs of the precarious nature of his dominion.

Besides their abilities to assist or annoy us, there are other circumstances which recommend this class of animals in a particular manner to our notice. Their situation and character are such as to afford us opportunities of more frequent intercourse with them than with other animals Fishes inhabit a different element: birds mount aloft in the air, and when they rest upon the earth generally prefer places inaccessible to man; insects are so minute as almost to elude our observation; reptiles shun our society, and their manners are far from inviting:—But quadrupeds cannot so easily avoid us; many of them eagerly associate with us, unless repelled by injuries; their manners and circumstances bear a considerable resemblance to our own; and the characters of many of them naturally attract our notice, and engage our affections.

The class of mammals, so particularly related to man, are remarkably superior in size and strength to those belonging to the other classes. The horse, the ox, the camel, the elephant, are among the strongest of the land animals. Few of the inhabitants of the ocean, or of rivers, are equal to the hippopotamus; and the cetaceous animals, which, from similarity of internal structure, from their being viviparous, and from their being furnished with a lactiferous organ are considered in the same class, are by far the largest animals of the waters.

In ingenuity, perhaps not less than in strength, quadrupeds enjoy also a superiority over most other animals. The familiar docility of the dog is well known. The address with which horses are trained to perform the evolutions of military discipline, affords the best proof of the extraordinary docility and sagacity of these animals. The cunning, and indeed the whole economy of the monkey tribe, seem to exceed even the ordinary instances of human ingenuity. The sagacity and the social dispositions of the beaver are not less admirable. In short, ingenuity, or a most wonderful instinct, little inferior in many instances to the boasted wisdom of man, distinguishes this class of animals, as eminently as form, strength, size, and other relations to the human species, above the other lower ranks of the animal creation.

In beauty and elegance of form, too, quadrupeds greatly excel most other animals. We admire the downy plumage, the brilliant colours, and the melodious voices of birds: the gaudy painting of the butterfly, and of various other insects, charm the virtuoso: golden fishes and spotted lizards find likewise their admirers: but the fine proportions of the dog and the horse are unequalled among the other tribes of animated nature; and, compared with the beauties of shape, those of colour are of a very inferior kind. We are, perhaps, better judges of the beauty of tame quadrupeds than of that of other animals. Habit has amazing power to reconcile us to things odious, and to render us fond of things which we should otherwise regard with indifference: the forms of these animals are familiar to us; and it may be for that reason that they please. Besides, utility has certainly some influence on our ideas of beauty. However these things be, it is undeniable that among the class of quadrupeds are to be found the animals the most remarkable for elegance and harmony of shape.

Man may proudly boast that the earth was made for him; but a little reflection may lead him to acknowledge, that, at least in a secondary view, it has been likewise designed for the accommodation and maintenance of these animals. Of the herbage and fruits which it produces quadrupeds enjoy a greater share than any other tribes of the inferior animals; and a greater, perhaps, than even man himself. See PHYSIOLOGY and ZOOLOGY.

MASULIPATAN, a town on the Coromandel coast in the East Indies. The inhabitants are Gentoos. Its trade has greatly decreased since the English have left off trading in chintz. It is about 200 miles N. of Fort St. George. Lat. 16. 15 N. Lon. 81. 15 E.

MAT. *s.* (meatte, Saxon.) A texture of sedge, flags, or rushes (*Carew*).

To MAT. *v. a.* (from the noun.) 1. To cover with mats. 2. To twist together: to join like a mat (*Dryden*).

MAT-GRASS, in botany. See NARDUS.

MAT-WEED. See LYGEUM.

MATACA, or MANTACA, a commodious bay on the north side of the island of Cuba, in America. The galleons usually take in fresh water here on their return to Old Spain.

MATADORE. *s.* (*matador*, Spanish.) One of the three principal cards in the games of ombre and quadrille (*Pope*).

MATACHIN. *s.* (Fr.) An old dance (*Sid.*).

MATALONA, a town of Terra di Lavora, in Naples, Italy. It is 8 miles N.W. of Capua. Lat. 41. 12 N. Lon. 14. 14 E.

MATALISTA RADIX. A root said to be imported from America, where it is given as a purgative, its action being rather milder than that of jalap. Its arrangement in the sexual system not known.

MATAMAN, a country of Africa, bounded on the N. by Benguela, on the E. by parts unknown, on the S. by the country of the Hottentots, and on the W. by the Atlantic Ocean. There is no town in it, and the inhabitants live in miserable huts, it being a desert country, little visited by the Europeans.

MATAN, or MACTAN, one of the Philippine Islands. Here Magellan was killed in 1521; and the inhabitants have since thrown off the yoke of Spain.

MATAPAN (Cape), the most southern promontory of the Morea, between the gulf of Coron and that of Colochina. Lon. 22. 40 E. Lat. 36. 25 N.

MATARAM, a large town, formerly the capital of an empire of that name, in the island of Java. It is strong by situation, and seated in a fertile and populous country, surrounded by mountains. Lon. 111. 55 E. Lat. 7. 1 S.

MATARO, a town of Spain, in Catalonia, remarkable for its glass works, and the best red wine made in the province. It is seated on the Mediterranean, 15 miles N.E. of Barcelona. Lon. 2. 29 E. Lat. 41. 36 N.

MATCH. *s.* (*meche*, French) 1. Any thing that catches fire (*Bacon*). 2. (from maca, Sax.) A contest; a game (*Shak.*). 3. One equal to another; one able to contest with another (*Rogers*). 4. One that suits or tallies with another. 5. A marriage (*Shakspeare*). 6. One to be married (*Clarendon*).

To MATCH. *v. a.* (from the noun.) 1. To be equal to (*Shak.*). 2. To show an equal (*South*). 3. To oppose as equal (*Milton*). 4. To suit; to proportion (*Roscommon*). 5. To marry; to give in marriage (*Donne*).

To MATCH. *v. n.* 1. To be married (*Sid.*). 2. To suit; to be proportionate; to tally.

MATCH OF HUNTING, or *Heats for a plate*; an object not strictly within the views of veterinary medicine, yet important in equestrian economy, and abundantly interesting to the sportsman. In order to ride to the best advantage, either a hunting-match, or three heats and a course for a plate, we are told by writers on this subject (whom we implicitly follow), that the first thing requisite is a rider, who ought to be a faithful one, in whom you can confide. "He should have a good close seat, his knees being held firm to his saddle-skirts, his toes being turned inwards, and his spurs outwards from the horse's sides, his left hand governing the horse's mouth, and his right commanding the whip; taking care, during the whole time of the trial, to sit firm in the saddle, without waving, or standing up in the stirrups, which actions do very much incommode a horse, notwithstanding the conceited opinion of some jockies, that it is a becoming seat,

"In spurring his horse, he should not strike him hard with the calves of his legs, as if he would beat the wind out of his body, but just turn his toes outwards, and bring his spurs quick to his sides, and such a sharp stroke will be of more service towards the quickening of the horse, and sooner draw blood. Let him be sure never so spur him but when there is occasion, and avoid spurring him between his shoulders and girths (which is the tenderest part of a horse) till the last extremity. As to the whipping the horse, it ought to be over the shoulder on the near side, except in hard running, and when at all, strike the horse in the flank with a strong jerk, the skin being tender there, and most sensible of the lash.

"He must observe, when he whips and spurs his horse, and is certain that he is at his utmost speed, if then he clap his ears to his pole, or whisk his tail, he may be sure that he bears him hard; and then he ought to help him as much as he can, by sawing his snaffle to and fro in his mouth, and by that means forcing him to open his mouth, which will give him wind.

"If in the time of riding there is any high wind stirring, if it be in his face, he should let the adversary lead, he holding hard behind him till he sees an opportunity of giving a loose; yet he must take care to keep so close to him that his adversary's horse may break the wind from his, and that he, by stooping low in his seat, may shelter himself under him, which will assist the strength of his horse. But on the contrary if the wind be at his back, he must ride exactly behind him, that his own horse may alone enjoy the benefit of the wind, by being as it were blown forward, and by breaking it from his adversary as much as possible.

"In the next place, observe what ground your horse prefers most to run on, and bear the horse (as much as your adversary will give you leave) on level carpet ground, because the horse will naturally be desirous to spend himself more freely thereon; but on deep earths give him more liberty, because he will naturally favour himself upon it.

"If you are to run up hill, do not forget by any means to favour your horse, and bear him, for fear of running him out of wind; but if it be down hill (if your horse's feet and shoulders will endure it, and you dare venture your neck) always give him a loose.

"This may be observed as a general rule, that if you find your horse to have the heels of the other, that then you be careful to preserve his speed till the last train-scent, if you are not to run a strait course; but if so, then till the end of the course, and so to husband it then also, that you may be able to make a push for it at the last post.

"In the next place you are to acquaint yourself, as well as you can, with the nature and temper of your adversary's horse; and if he be fiery, then to run just behind, or just cheek by joul, and with your whip make as much noise as you can, that you may force him on faster than his rider would have him, and by that means spend him the sooner; or else keep just before him, on such a slow gallop, that he may either overreach, or by treading on your horse's heels (if he will not take the lead) endanger falling over.

"Take notice also on what ground your opponent's horse runs the worst, and be sure to give a loose on that earth, that he may be forced to follow. In like manner, in your riding observe the several helps and corrections of the hand, the whip, and the spur, and when and how often he makes use of them; and when you perceive that his horse begins to be blown by any of the former symptoms, as clapping down his ears, whisking his tail, holding out his nose like a pig, &c. you may then take it for granted that he is at the height of what he can do; and therefore in this case take notice how your own rides, and if he run cheerfully and strongly, without spurring, then be sure to keep your adversary to the same speed, without giving him ease, and by so doing you will quickly bring him to give in, or else distance him. Observe at the end of every train-scent what condition the other horse is in, and how he holds out in his labour, of which you may be able to make a judgment by his looks, the working of his flanks, and the slackness of his girths. For if he look dull, it is a sign that his spirits fail him; if his flanks beat much, it is a token that his wind begins to fail him; and consequently his strength will do so too.

"If his wind fail him, then his body will grow thin, and appear tucked up, which will make his girths, to the eye, seem to be slack; and therefore you may take this for a rule, that a horse's want-

ing girting after the first scent, provided he were girt close at his first starting, is a good sign, and if you find it so you need not much despair of winning.

"After the end of every train-scent, and also after every heat for a plate, you must have dry straw and dry cloths, both linen and woollen, which have been steeped in urine and salt-petre a day or two, and then dried in the sun, and also one or two of each must be brought into the field wet; and after the train has been ended, two or three persons must help you, and after the groom has with a knife of heat (as it is called by the duke of Newcastle), which is a piece of an old sword blade, scraped off all the sweat from the horse's neck, body, &c. then they must rub him well down dry, all over, first with the dry straw, and then with dry cloths, whilst others are busy about his legs; and as soon as they have rubbed them dry, then let them chafe him with the wet cloths, and never give over till you are called by the judges to start again. This will render his joints pliant and nimble, and prevent any inflammation which might arise from any old strain."

The next thing regarded by the writer of these profound instructions is the judges' or triers' office. These are persons appointed to see that all things are ordered according to the articles agreed on. These, which are read before the horses start, are as follow:

1. That each trier, on whose side the train is to be led, according to the articles, give directions for its leading, according to the advice of the rider, or his knowledge of the nature and disposition of that horse on whose side he is chosen.

2. That each trier be so advantageously mounted, as to ride up behind the horses (but not upon them) all day, and to observe that the contrary horse ride his true ground, and observe the articles in every particular, or else not to permit him to proceed.

3. That after each train-scent be ended, each trier look to that horse against which he is chosen, and observe that he be no ways relieved but with rubbing, except liberty on both sides be given to the contrary.

4. As soon as the time allowed for rubbing be expired, which is generally half an hour, they shall command them to mount, and if either rider refuse, it may be lawful for the other to start without him; and having beat him the distance agreed on, the wager is to be adjudged on his side.

5. The triers shall keep off all other horses from crossing the riders; only they themselves may be allowed to instruct the riders by word of mouth how to ride, whether slow or fast, according to the advantages he perceives may be gained by his directions.

6. If there be any weight agreed on, they shall see that both horses bring their true weight to the starting-place, and carry it to the end of the train, upon the penalty of losing the wager.

The same rules are to be observed, especially this last, by those gentlemen who are chosen to be judges at a race for a plate, only they usually stay in a stand, that they may the better see which horse wins the heat.

"Now," continues the writer, "in running for a plate, there are not so many observations to be made, nor more directions required, than what have been already given, only this, if you know your horse to be rough at bottom, and that he will stick at mark, to ride him each heat according to the best of his performance, and avoid as much as possible either riding at any particular horse, or staying for any, but to ride each heat throughout with the best speed you can.

"But if you have a very fiery horse to manage, or one that is hard-mouthed and difficult to be held, then start him behind the rest of the horses, with all the coolness and gentleness imaginable; and when you find he begins to ride at some command, then put up to the other horses, and if you find they ride at their ease, and are hard held, then endeavour to draw them on faster; but if you find their wind begin to rake hot, and that they want a sob, if your horse be in wind, and you have a loose in your hand, keep them up to their speed, till you come within three quarters of a mile of the end of the heat, and then give a loose and push for it, and leave to fortune and the goodness of your horse the event of your success.

"Lastly, when either your hunting-match or the trial for the plate is ended, as soon as you have rubbed your horse dry, clothe him up and ride him home, and the first thing, give him the following drink to comfort him:

"Beat the yolks of three eggs, and put them into a pint and a half of milk, then warm it and put to it a little saffron, and three spoonfuls of salad-oil, and give it him in a horn.

"Having done this, dress him slightly over with the curry-comb, brush, and woollen-cloth, and then bathe the place where the saddle stood with warm sack, to prevent warbles; and wash the spurring-places with urine and salt: then litter the stable very well, clothing him up as quickly as possible, and let him stand for two hours. Then feed him with rye bread, after that with a good mash, and give him his belly-full of hay, and what corn and bread he will eat. Then having bathed his legs well, leave him corn in his locker, and so let him rest till the next morning, at which time order him as in his days of rest."

The ordering a horse for a Match, or Plate, is a most important part of equestrian discipline. The reasoning on this subject would disgust an enlightened veterinarian, no less than the system of jockeyship we have just unfolded, though for a different reason. We shall therefore confine ourselves to a few particulars, which will shew the customary method of training horses designed for the turf. "When you have either matched your horse, or design to put him in for a plate," says the writer, "you should consider that you ought to reserve a month, at least, to draw his body perfectly clean, and to refine his wind to that degree of perfection that is capable of being attained by art.

"In the first place, take an exact view of the state of his body, both outwardly and inwardly, as whether he be low or high in flesh, or whether he be dull and heavy when abroad; and if this has been caused by too hard riding, give him half an ounce of diapente in a pint of good old Malaga sack, which will both cleanse his body and revive his spirits. Then for the first week feed him continually with bread, oats, and split beans, giving him sometimes the one and sometimes the other, according to what he likes best, always leaving him some in his locker for him to eat at leisure when you are absent; and when you return at your hours of feeding, take away what is left, and give him fresh, till you have made him wanton and playful. To this purpose, take no-

tice. that though you ride him every day, morning and evening, on airing, and every other day on hunting, yet you are not to sweat him, or put him to any violent labour, the design of his week's ordering being to keep him in wind and breath, and to prevent pursiveness.

"You must now make a finer bread than before, as follows: Take two pecks of beans, and a peck of wheat, and let them be ground together, but not too fine, to prevent too much bran being in the bread; and dress one peck of the meal through a fine range, and knead it up with new ale-yeast, and the whites of a dozen new-laid eggs. and bake this in a loaf by itself; but dress the rest of the meal through a boulter, and knead it only with ale and yeast, and use it in all other points as the former: the peck loaf is to be given the horse when you set him, and the other at ordinary times. This bread very much increases the strength, courage, and wind of the horse.

"If your horse be brisk and lively, when you lead him out of the stable he will leap and play about you, then you must not only omit giving him the sack and diapente, but any other dose whatsoever; for it will rather prey upon the strength of his body, and by that means weaken him.

"If your horse be engaged in a hunting-match, you must sweat him twice this week, not by hunting him after the hare, but by train-scents, since the former, on this occasion, may prove deceitful; for though the hounds should be very swift yet the scent being cold, the dogs will very often be at fault, and by that means the horse will have many sobs: so that when he comes to run train-scents in earnest, he will expect ease for his wind. Therefore lead your train-scents with a dead cat, over such grounds as you are likely to run on, and best agrees with the humour of your horse, and also choose the fleetest hounds you can get, and they will keep your horse up to the height of his speed. As to the number of train-scents which you should ride at a time, that is to be ordered according to the match you are to run, or rather according to the strength of your horse, and ability for performing his heats; for if you labour him beyond his strength, it will take him off his speed, weaken his limbs, and daunt his spirit. If you give him too little exercise it will render him liable to be pursive, and full of humours, and incline him to a habit of laziness, so that when he comes to be put to labour beyond his usual rate, he will grow restive and settle, like a jade. But so far may be said by way of direction, that if you are to run eight train scents, and the strait course, more or less, you are not to put him to such severe labour above twice in the whole month's keeping. And if it be in the first fortnight it will be the better, for then he will have a whole fortnight to recover his strength in again: and as for his labour in his last fortnight, let it be proportionate to his strength and wind, as sometimes half his task, and then three quarters of it.

"Only observe, that the last trial you make in the first fortnight be a train-scent more than your match, for by that means you will find what he is able to do. And as to the proportion of his exercise twice a week, that is sufficient to keep him in breath, and yet will not diminish or injure his vigour. But if your hunting-match be to run fewer trains, then you may put him to his whole task the oftener, according as you find him in condition; only observe that you are not to strain him for ten days at least before he ride his match, that he may be led into the field in perfect strength and vigour.

"If you design your horse for a plate, let him take his heats according to this direction, only let him be on the place, that he may be acquainted with the ground; and as for the hounds, you may omit them, as not being tied to their speed, but that of your adversary's horse. But as to the number of heats, let them be according to what the articles exact; only observe, that, as to the sharpness of them, they must be regulated according to the strength, and the goodness of his wind. And when you heat him, provide some horses upon the course to run against him; this will quicken his spirits and encourage him, when he finds that he can command them at his pleasure. And here too you must observe the same rule, not to give the horse a bloody heat for ten days, or a fortnight, before the plate is to be run for; and let the last heat you give him before the day of trial be in all his clothes, and just skelp it over, which will make him run the next time the more vigorously when he shall be stript naked, and feel the cold air pierce him.

"During this month, and on his resting days, and after his sweats on heating-days (if there be any occasion for sweating him) you must observe the same rules which have been given for the first week of the third fortnight's keeping, only you must omit all scourings but rye bread and mashes, since your horse being in so perfect a state of body has no need of any.

"During the last fortnight you must give him dried oats that have been hulled by beating and having washed half a strike of oats in the whites of a dozen or twenty eggs, stir them together, and let them lie all night to soak, and spread them abroad in the sun the next morning, till they are as dry as they were at first, and so give them to your horse, and when they are spent, prepare another quantity after the same manner This food is light of digestion, and very good for his wind.

"You must hull his beans also, but not give him them so often, if he will eat his oats without them; and as for his bread at this time, make that of three parts wheat, to one of beans, and order it as before directed. But if you find your horse inclinable to be costive then give him oats washed in two or three whites of eggs, and ale beaten together, to cool his body, and keep it moist. Give him not any mash for the last week, only the barley-water before directed, but let him have his fill of hay, till a day before he is to ride the match, when you must give it him more sparingly, that he may have time to digest what he has eaten, and then, and not before, you may muzzle him with a cavesson; and be sure that day, and not till the morning he is let out, to feed him as much as possible, for such a day's labour will require something to maintain his strength. Therefore in the morning before you are to lead out, give him a toast or two of white bread steeped in sack, which will invigorate him; and when you have done, lead him out into the field.

"But if you are to run for a plate, which commonly is not till three o'clock in the afternoon, then by all means have him out early in the morning to air, that he may empty his body, and when he is come in from airing, feed him with toasts in sack; considering, that as too much ful-

ness will endanger his wind, so too long fasting will cause faintness.

"When he has eaten what you have thought fit to give him, put on his cavesson, and having afterwards well chafed his legs with piece-grease and brandy warmed together, or train-oil (which likewise ought to be used daily at noon, for a week before the match, or longer if you see cause), shake up his litter, and shut the stable up close, and take care that there is no noise made near him, and let him rest till the hour come that he is to go out into the field." For the rest, see HORSE-RACING.

MATCH, a kind of rope slightly twisted, and prepared to retain fire for the uses of artillery, mines, fireworks, &c. It is made of hempen tow, spun on the wheel like cord, but very slack; and is composed of three twists, which are afterwards again covered with tow, so that the twists do not appear: lastly, it is boiled in the lees of old wines. This, when once lighted at the end, burns on gradually and regularly, without ever going out, till the whole is consumed: the hardest and driest match is generally the best.

MATCH (Quick), used in artillery, is made of three cotton strands drawn into lengths, and put into a kettle just covered with white wine vinegar, and then a quantity of saltpetre and mealed powder is put into it, and boiled till well mixed. Others put only saltpetre into water, and after that take it out hot, and lay it into a trough with some mealed powder, moistened with some spirits of wine, thoroughly wrought into the cotton by rolling it backwards and forwards with the hands; and when this is done they are taken out separately, drawn through mealed powder, and dried upon a line.

M. Proust, and M. Cadet, in Journal de Physique, describe an economical substitute for quick match in the artillery service.

The Spanish ambassador at Vienna, in 1789, gave notice to his court, that the use of thin rods of lime tree soaked in a solution of nitrate of lead, was adopted in the Imperial service in lieu of quick-match. Mr. P. has forgot whether the author of this discovery was named, but it was probably baron Born.

As the lime or linden tree is scarce in Spain, other woods were tried. The principal fault of these wooden rods is the brittleness of their point, but this does not entirely extinguish them, for it is sufficient to twirl them about a little to relight them.

A pound of nitric acid at 36° yields, with lead, upwards of 15 oz. of dry nitrate; but as a great part of the acid is wasted in oxydizing the metal, if this was employed in the state of oxide, more might be obtained; thus, a pound of the same acid treated with litharge yielded nearly 23 oz. of nitrate. The loss of acid in the former process was very great, for a pound of nitric acid at 25° yields, with potash, 8 oz. of saltpetre; but if another pound be treated with metallic lead, and the nitrate decomposed by potash, only 3 oz. of saltpetre is obtainable.

The rods must not be too thick, or otherwise the nitrate does not penetrate to the centre; the best thickness is about 2 or 2½ lines ($\frac{1}{6}$ or $\frac{1}{5}$ inch) but in order to increase their strength they may be made broader one way than the other. Yet thick rods have some advantages, for the unimpregnated centre burning slower than the superficial parts, gives a solidity to the lighted point, and renders it less liable to break off.

Rods of willow or elm will not burn unless they are impregnated throughout, and those of ash and beech which are more than a line ($\frac{1}{12}$ inch) thick, do not absorb sufficient nitrate to burn without being liable to go out.

The solution may be made of two different strengths; that of one pound of nitrate in 4 of water is best for green oak, elm, and willow; and that of one pound of nitrate in 5 of water for lime-wood, oak, fir, walnut, white poplar and cedar. The impregnation may be performed in 3 days in the cold, or in one hour and a half, if the solution is boiled.

Rope made of broom-stalks, about ¾ in. thick, may be advantageously impregnated with a solution of one pound of nitrate in 15 of water. This is superior to the others, because it will burst into a flame if it be twirled round, and so perform the office of a port-fire. It might probably be still more useful if it was spun with a better prepared strand in the centre, or with the *pattle* (rush?) so common in the interi r of Spain.

The following are the results of the experiments made with nitrate of lead.

Woods, &c.	Duration of the combustion of 2 lb. Hours.	Nitrate absorbed by an cwt lb.
Quickmatch	850	
Broom rope prepared	850	4
Lime	2300	10
Fir	2100	42
Cedar	2400	42
Elm	2430	19
Oak	2200	16
Green oak	1100	18
Walnut	1400	7
White poplar	1400	37
Willow	2400	30

Hence it is evident that the lime is the best, that the oaks, elm, and walnut are next best, and that poplar, fir, cedar and willow absorb a great quantity of nitrate without any advantage.

The nitrate of copper may be used instead of the nitrate of lead, and its power of increasing the combustion is such, that the rods taken fresh out of the solution burn equally well as those impregnated with nitrate of lead do when dried. It is not so much the acid of these salts that produce the effects as might be supposed, for if they are soaked for some time in water, they still preserve much of their peculiar qualities. It rather appears that the oxides of these nitrates separate from the acid and attach themselves to the substance of wood, and then furnish the oxygen necessary to the combustion of the rods; agreeable to this opinion, the lead is reduced in grains, and the copper coats the point with a thin sheath of metal which it is sometimes necessary to get rid of, by striking the point against the cannon.

One pound of nitric acid at 36° is saturated by 2¼ oz. of copper. The solution used to impregnate the rods exhibited 17° of Beaume's hydrometer. The solution of copper procured in the process of parting by the refiners may be employed; and if a proper proportion of lead is boiled in it, this solution may be changed into nitrate of lead; but if too much lead is added, a yellow lamellar nitrate is formed, whose effect on wood is unknown.

Walnut wood does not absorb sufficient nitrate of copper to form fire sticks.

Nitrate of iron is unfit for this purpose, as it does not yield its oxygen, so easily as that of lead or copper.

The following are the results of the experiments with nitrate of copper

Woods, &c.	Duration of the combustion of 25lb. Hours.	Nitrate absorbed by an cwt. lb.
Quickmatch	850	-
Lime	2500	6
Fir	2300	8
Elm	2100	7
Oak	2400	4
Green oak	2050	9
White poplar	2010	6
Willow	2130	9
Ash	1300	2

The superiority of the new firesticks is evident; a portfire lasts only three or four minutes, and is subject to break in carriage, and to throw out dangerous sparks; the firestick, a yard long, burns for three hours, is solid and not liable to be broke, or to throw out any sparks. As to the price, the saving is very considerable; a portfire costs from 6 to 9 sous, i. e. about 4½d, and the firestick from only 3 to 4 sous i e. about 1½ or 2d.

The firesticks have been used in the most rainy weather without being extinguished, their combustion was only somewhat slackened.

Mr. C. gives the following directions for preparing these fire-sticks. The wood is to be sawn into square laths ⅓ metre (yard) long, and 6 lines (½ in.) thick. Round rods do not afford so good a point as the square laths, which are terminated when in use by a quick-cone, about two inches long These laths ought to be made of wood that has been at least a year in store, and moreover exposed for half a day to the heat of a stove, heated to 30°. Cels. For want of a stove, they may be put into a baker's oven after the bread is drawn

The nitrate of lead is best prepared by putting 16 ounces of litharge or red lead into a glass vessel, and pouring it on 13 ounces of nitric acid, (i. e. aquafortis) at 40° Beaume, mixed with 4 oz. of distilled water; the mixture is then to be heated until the solution is finished, when it is to be filtered and evaporated to dryness. It ought to yield about 20 oz. of nitrate of lead. Care must be taken that a sufficient quantity of the oxide of lead is used, otherwise the acid not being saturated will corrode the boiler.

The rods being laid in a well-tinned copper boiler, the necessary quantity of nitrate is to be added, and some water in the proportion of about a quart of water to each pound of the nitrate. The rods are to be kept down under the liquor by a piece of tinned copper laid upon them; the boiling is to be continued for six hours, adding fresh water as the other boils away. When the boiling is finished, they are to be taken out, drained, and then dried in a stove

They are then to be put into a copper, or cast iron vessel, placed upon a sand bath. Oil of turpentine is to be added until it rises about an inch above them, and the whole slowly heated until the oil boils. As soon as it becomes white, and begins to rise, the vessel must be covered, and taken from the fire until it subsides, when it is again to be replaced upon the bath. This heating to ebullition ought to be repeated two or three times. When the oil is cold, the rods are to be wiped, and finally dried again in the stove for use. See farther on this interesting subject, Nos. 9 and 11 of the Retrospect of Philosophical Discoveries.

MATCH (Cock). See MAIN OF COCKS. A cock intended to fight in a match must not be less in weight than three pounds six ounces, nor more than four pounds eight ounces.

MATCHABLE. *a.* (from *match.*) 1. Suitable; equal; fit to be joined (*Spenser*). 2. Correspondent (*Woodward*).

MATCHLESS. *a.* (from *match.*) Having no equal (*Waller*).

MATCHLESSLY. *ad.* In a manner not to be equalled.

MATCHLESSNESS. *s.* (from *matchless*). State of being without an equal.

MATCHMAKER. *s.* (*match* and *maker*). 1. One who contrives marriages (*Hudibras*). 2. One who makes matches to burn.

MATCOWITZ, a strong town of Upper Hungary, in the county of Scepus, seated on a mountain, 185 miles N.E of Presburgh.

MATE. *s* (maca, Saxon.) 1. A husband or wife (*Spenser*). 2. A companion, male or female (*Dryden*). 3. The male or female of animals (*Milton*). 4 One that sails in the same ship (*Roscommon*). 5. One that eats at the same table. 6. The second in subordination in a ship: as, the master's *mate*; the chirurgeon's *mate*.

To MATE. *v. a.* (from the noun.) 1. To match; to marry (*Spenser*). 2. To be equal to (*Dryden*). 3. To oppose; to equal (*Shak*). 4. (*matter*, French.) To subdue; to confound; to crush: not in use (*Shakspeare*).

MATELICA, an ancient town of Italy, in the marquisate of Ancona, 15 miles S. of Jesi.

MATER (DURA and PIA) the names given by anatomists to the two membranes which surround the brain. See ANATOMY, and BRAIN.

MATERA, a town of Naples, in Terra d'Otranto, with a bishop's see; seated on the Canapro, 33 miles N.W. of Tarento. Lon. 16. 54 E. Lat. 40. 59 N.

MATERIA MEDICA. (*materia medica*, Lat. Literally *the matter* of remedy; though uniformly, by a misnomer, employed to signify the *means* of remedy.) The substances employed in the medical art in their most simple state; for in any state of combination or composition they constitute a part of what is called pharmacy, or the science of medical preparations.

A very short time since, the writer of this department in the Pantologia was requested to furnish an article upon the same subject in another and a highly respectable dictionary of sciences. He complied; and as he cannot add much to what he then contributed, he will again copy from the manuscript; with the important alteration, however, of adjusting the general table of the materia medica of Edinburgh, Dublin, and London, to the substances and names of the new edition of the London College, which was then only in a state of preparation.

It is a subject of curiosity, rather than of use, to enquire by what means mankind were induced in the first instance to have recourse to substances, when in a state of disease, which, for the most part, they abhor and fly from when in a state of health; and how they came to discern that in these substances chiefly nature has treasured up the remedies of sickness, the restoratives of a vitiated or debilitated constitution. From whatever

source this knowledge has been derived, we feel it daily to be a knowledge of a very important character, and we are sensible of its having been very generally diffused at a very early period of ancient history. Accident in the first instance, and experience confirming the result of some fortunate discovery, were perhaps the chief foundation of therapeutic science in the simplest and rudest ages of the world. Yet the whole can by no means be traced to this source, for the general fallacy of experience is sufficient to prove that it has had but a very small share in establishing the virtues which have been ascribed to most medicines: and it was probably from a too frequent disappointment in practice, from palpable proof of the uncertainty of those remedies which are recommended by the ancients, that physicians, in times comparatively modern, have been induced to seek for means not only of ascertaining more exactly the qualities of established medicines, but of investigating the virtues of substances altogether new and untried.

Hence unquestionably the union of chemistry with the art of healing, for among the earliest chemists we meet with the first attempts at departing from the usual catalogue of medicines in pursuit of a new list. Paracelsus led the way by introducing the absurd notion of astral influences and of signatures; to which succeeding and more rational chemists suggested the utility of a chemical analysis. The doctrine of astral influences and of signatures has been altogether exploded for a long time, though we still trace certain vestiges of its former existence in many of our latest publications on the materia medica. Chemical analysis, as it ought to do, has completely triumphed over the two former systems, and is daily extending its enquiries. To arts, manufactures, and commerce, these enquiries have been pre-eminently useful; nor have they been without their benefit to medicine; yet the benefit resulting from this last application has by no means been equal to that which has resulted to the two former.

The means then resorted to in the present day for determining substances to be remedial or medicinal, or in other words the previous steps to their introduction into the materia medica, are their own sensible qualities, their botanical affinity, their chemical examination, and general experience.

Having introduced them into the medical catalogue, the two next subjects of consideration are their classification or arrangement; and the best mode of employing them, whether simply, and on account of their own specific virtues, or in connection with other substances, by which their proper qualities are so intermixed with the qualities of the other substances employed, as to acquire an increased, a diminished, or altogether a new action; and consequently to be productive of a different result.

The former consideration alone belongs, strictly speaking, to the present article; the latter constituting the proper subject of pharmacy or compound medicine. For the theory and practice, therefore, of combining and compounding medicinal substances, we refer our readers to the article PHARMACY; and shall here confine ourselves, as strictly as we may be able, to the materials actually employed in medicine, on account of their own supposed inherent virtues, and which for the most part are denominated *simples*.

What ought to be the classification of these materials? This is a question which has often been agitated, and almost as often answered in a different manner; whence the arrangement of different writers is as different as possible, as founded upon some supposed superior advantage, or even the mere fancy of the author himself. The most simple arrangement is that of an alphabetic form; and it has taken place in most of the dispensatories and pharmacopœias of modern times; but it conveys no practical information; indicates no specific virtue; communicates no scale of comparative power. Another arrangement is, that founded upon the quarter or the kingdom from which the material is derived; and of course under this system the materia medica is divided into the three grand classes of animal, vegetable, and mineral substances. Yet this arrangement does not appear to be of much more advantage than the preceding: the plan is even less simple; and the knowledge it communicates is too trivial to be of any importance. Another, therefore, and a better distribution is founded upon the sensible and more obvious qualities of the substances employed in medicine, from their being acid, absorbent, glutinous, unctuous, astringent, saccharine, acrid, aromatic, bitter, emetic, or cathartic. For this classification we are entitled to Cartheusen; it is highly ingenious, and so far as it is applicable, of considerable utility. But it labours under the defect of being incapable of general application. There are many simples, for example, and those even of great power and activity, in which we can distinguish no predominant sensible quality; there are many, again, in which various qualities are so equally united, that they have just the same claim to a position under one class or order as under another; and there are many, also, which though similar in their sensible qualities, are very dissimilar in their effects upon the animal frame. Thus though gentian and aloes agree in possessing a bitter taste, and sugar and manna in being sweet, their medical virtues are widely different. Accordingly Cartheusen himself is compelled to deviate occasionally from his general plan, and to found a part of his division on the medicinal effects of his materials; introducing not only a class of purgatives and emetics, but of vaporose inebriants and narcotics; under which last class he arranges tobacco, elder-flowers, saffron, opium, and poppy-seeds; substances, certainly, very discordant in all their qualities that relate to medicinal intentions.

The last division we shall notice is that of Vogel, who has classified his materials according to their effects on the human body. Some are found to have the property of rendering the solid parts of the frame more lax than before, and are hence denominated *relaxing* medicines; others possess a directly contrary power, and are consequently called *indurating* medicines. A third kind are found to excite inflammation in the part to which they are applied, and are therefore named *inflammatory;* while a fourth, from being perceived to increase or diminish the vigour of the body, or what is called the tone of the solids, have acquired the name of *tonics* in the first instance, and *sedatives* in the second. Some, again, are conjectured neither remarkably to increase nor diminish the tone of the solids; but to perform their office either by correcting some morbid matter in the body, or by evacuating it: in the former case they are called *alterants;* in the latter *evacuants*.

These are the general divisions or classes into which simple medicines are partitioned under this system; but when we begin to consider their virtues more particularly, a variety of inferior divisions must necessarily ensue. Thus, of the relaxing medicines, some, when externally applied, are

supposed merely to soften the part; and in such case are called *emollients;* while others, which are supposed to have a power of augmenting the disposition of the secernents of an inflamed part to the secretion of pus, are called *maturants* or *suppuratives*. Sedative medicines, that have the power of assuaging pain, are denominated *paregorics;* if they altogether remove or destroy pain, they are called *anodynes;* if they take off spasm, *antispasmodics;* if they produce quiet sleep, *hypnotics;* if a very deep and unnatural sleep, together with considerable stupefaction of the senses, *narcotics*. Tonic medicines, in like manner, obtain the name of *corroboratives*, *analeptics*, or *nervines*, when they slightly increase the contractile power of the solids; but of *astringents* or *adstringents*, if they do this in a great degree. Some of this order of medicines have been supposed to promote the growth of flesh, to consolidate wounds, and restrain hæmorrhages; and hence the names of *sarcotics* and *traumatics*, or *vulneraries;* names, however, which may well be dispensed with, as the quality is very questionable, and perhaps altogether erroneously ascribed. Other astringents, again, are denominated *repellent*, *discutient*, *stimulant*, or *attractive*, according to the respective modes by which they are conceived to produce one common effect. Medicines of the inflammatory tribe, are, in like manner, divided into *vesicatories* or *blisters*, if by their application they raise watery bladders on the skin; *catheretics*, *escharotics*, or *corrosives*, if they eat into and destroy the substance of the solid parts themselves; and *rubefactive* or *rubefacient*, if possessed of less power than the vesicatories, they merely produce a redness on the part to which they are applied, by increasing the action of a part, and stimulating the red particles of the blood into vessels which do not naturally possess them. The alterant tribe is divided into *absorbents*, *antiseptics*, *coagulants*, *resolvents*, *calefiants*, and *refrigerants*, according to the peculiar mode by which the different individuals of this tribe are supposed to operate. The evacuants are generally subdivided from the nature of the humour they are supposed to discharge: *emetics* if they evacuate the contents of the stomach by vomiting; *cathartics* if they induce purging; *laxatives* if they produce a moderate discharge of feces without pain or sickness; *eccoprotics* if the discharge be greater, but still confined to the common nature of the feces themselves. Thus again they are named *diaphoretics*, if they promote the expulsion of humours through the pores of the skin with a small increase of action; *sudorifics* if the increase of action be greater, and the discharge more copious. Such as excite urine are called *diuretics;* such as produce evacuation from the glands of the palate, mouth, and salivary ducts, *salivating* medicines; those that promote the discharge of mucus from the throat *apophlegmatics:* those that evacuate by the nose, *ptarmics*, *errhines*, *sternutatories;* and those which promote the menstrual discharge, *emmenagogues*. To this order, also, some writers reduce those medicines which expel any preternatural bodies, as worms, stones, and flatus or confined air: of these the first are called *anthelmintics;* the second, and especially when directed to the bladder, *lithontriptics;* and the third *carminatives*.

Such is the general outline of those who have adopted this kind of system. But it must be obvious, that though the general outline be the same, it may submit to a great variety of modifications; and hence, again, the writers who have made choice of this system, and founded their classifications upon the effects produced by the articles of which they have treated upon the human body, have arranged it in various ways according to their respective ideas of superior utility or convenience. Hence the classes of Cullen amount to twenty-four; those of Darwin to not more than seven; while others have given us twelve, fourteen, or fifteen, according to their own fancy.

The twenty-four classes of Dr. Cullen are as follow:

Astringents	Antacids
Tonics	Antalkalines
Emollients	Antiseptics
Corrosives	Errhines
Stimulants	Sialagogues
Sedatives	Expectorants
Refrigerants	Emetics
Antispasmodics	Cathartics
Diluents	Diuretics
Attenuants	Diaphoretics
Inspissants	Menagogues.
Demulcents	

The seven classes of Dr. Darwin are the ensuing:

Nutrients	Invertents
Incitants	Revertents
Secernents	Torpents.
Absorbents	

It will appear, even upon a superficial examination of the first of these classifications, that the first is unnecessarily diffuse: that some of the divisions might be introduced under one common head, as for example those of emollients and demulcents; diluents and attenuants; and that for one or two of them there is little foundation in nature. We particularly allude, in this last instance, to the antalkalines, which are obviously only introduced as a sort of graceful contrast to the antacids; and concerning which the writer himself observes, "had it not been to give some appearance of system, and from my complaisance to Dr. Boerhaave, who treats *de morbis ex alkali spontaneo*, I should not have admitted of this chapter; for I am well persuaded that no alkaline salt, in its separate state, ever exists in the blood-vessels of the living human body." This is not the only instance, however, in which we find men of judgment and deserved reputation consenting to propagate errors, from the mere love of system, or from attachment to names of extensive celebrity. Happy would it be for us that all who thus act should avow their error like the author before us, and thus put the remedy by the side of the evil.

The classification of Dr. Darwin, however, labours under still stronger objections. Instead of being too diffuse, it is too contracted, for we may defy the warmest supporter of the Darwinian school to simplify and arrange the whole of what is included in the preceding classification, or that ought to be so included, under the present. But it has a fault still more prominent; and that is, it is adapted to an individual nosology, we mean the nosology of the author himself; and this a nosology which, in some of its divisions, is perhaps founded on mere fancy, and consequently has no chance of a permanent or general adoption. His *invertentia* and *revertentia* depend upon actions which, to say the least of them, are highly doubtful, and have for some years been gradually sinking into disbelief.

Between these two extremes, we have had a variety of arrangements of late years, one of the best of which, perhaps, is Dr. Kirby's, published in a

small tract, entitled, Tables of the Materia Medica, which, with a chemical and a miscellaneous division, consists of eighteen classes; but to both which we cannot but object; to the first, as it enters too deeply into the department of pharmacy for a mere list of the materials of medicine; and to the second, as evincing a carelessness or want of methodizing talent, which we should not have expected, and a total departure from every system whatever. We shall nevertheless avail ourselves of its general merit as far as we may be able, and endeavour to correct its deficiencies.

There is, however, another point to which we must advert before we proceed to our classification; and that is the nomenclature by which the different substances ought to be distinguished. Till of late, from the use of different nomenclatures by different colleges of medicine, and an absurd intermixture of several of them by some writers, the whole has been a scene of perplexity and confusion. Within the last six or seven years, however, a disposition has been progressively evinced to simplify and generalize the technology, and render the descriptions more accurate. The language of Linnéus has been resorted to as by common consent throughout the three kingdoms of animals, vegetables, and minerals; and though the chemical vocabulary of Lavoisier has not yet been generally introduced, it is daily gaining ground in the publications of individual writers, and has been admitted in its utmost latitude into one or two of our collegiate pharmacopœias. The College of Edinburgh, as it has long led the way as a medical school, has also taken the lead in this instance, and has the honour of having first composed a pharmacopœia in the pure and unmixed language of science, by its last edition, published in November 1804. The Dublin College has followed its example; and at length the College of London, stimulated by such noble incentives, has also roused itself, and re-edited its pharmacopœia, with a variety of modern improvements. The general nomenclature of this will not be found to vary essentially from the nomenclature of the Edinburgh pharmacopœia, and especially in that part of it which relates to the materia medica, the immediate object before us, excepting that the terms are for the most part materially abbreviated.

We freely confess our surprise that, from the errors resulting from a promiscuous use of weights and measures, nothing very decisive has been attempted by any of the pharmacopœias. It would have added largely to the reputation of the edition of the London College, if it had adopted the decimal and applicable menstruation of the French Institute, at the same time that it consented to admit the French nomenclature. It has not, however, been altogether inactive upon this subject, for it has exchanged the words *ounces* and *drams*, in the measurement of liquids, for *fluidounces* and *fluidrams*, *fluiduncia* and *fluidrachma*; and has altogether banished the word *drop (gutta)* as an indeterminate quantity, and has coined the term *minim (minimum)* as a substitute; meaning by minim or minimum the sixtieth part by measure of a fluidounce, in the same manner as a grain is the sixtieth part of an ounce solid: and glass measures are now manufactured, and may be had at any of the glass shops, properly graduated, for the purpose of ascertaining this minute proportion.

To this change we assent most heartily: the necessity is clear, and the term is elegant. *Fluidrams* and *fluidounces*, however, make a queer kind of compound; and if any thing of the sort were attempted, they should have been *liquidrams* and *liquidounces*, since the term liquid is now, by a kind of general consent among chemists, confined to express permanent fluids specifically (such as are uniformly intended in the pharmacopœia) while that of *fluid* is applied generically to denote gasseous, as well as permanent fluids.

Independently of these changes, we have to remark that the liquid *libra*, or pint, is now exchanged for the term *octarus;* and this also may have its advantage in occasionally preventing confusion, where the peculiar kind of libra is not sufficiently pointed out.

In glancing over the regulations of the Edinburgh College upon this subject, we perceive it has carried the point of simplicity to a still greater, perhaps to an inconvenient, and even culpable extent; for, apparently in utter despair of obtaining any thing like certain in measuring medicines, it has made a general proscription of this kind of graduation in every instance: so that in the Edinburgh forms the liquids of every sort are supposed to be employed by weight alone.

In the ensuing classification, we have been anxious to give our readers a general and concentrated view, as far as we have been able, not only of the substances employed, but of the form and preparation in which they are exhibited in the new editions of the three national pharmacopœias of London, Edinburgh, and Dublin. We may be told, perhaps, that we are hereby, in some measure, intrenching upon the province of pharmacy, properly so called. We are not insensible to the remark: but we hereby gain an advantage which no other plan could present to us; we offer at one and the same time a table of comparative statements, and shew the various forms in which the same material becomes an officinal drug. We have also been anxious to exhibit, in every instance, a glance at the common dose for adult age, as well as to specify, in terms as abbreviated as possible, the name of the country in which the different articles exist indigenously; the part or organ of the substance employed; and the disease in which it is supposed to be efficacious. The classification is as follows; and every class is subdivided, as far as possible, into an animal, a vegetable, and a fossile section.

Emetics	Refrigerants
Expectorants	Astringents
Diaphoretics	Tonics
Diuretics	Stimulants
Cathartics	Antispasmodics
Emmenagogues	Narcotics
Errhines	Anthelmintics
Sialagogues	Absorbents
Emollients	

CLASS I. EMETICA.

SECT. I. ANIMALIA.

Murias Ammoniæ. Edin. Lond.
Sal ammoniacum. Dub.
Britannia.
Aq. carbonatis ammoniæ. E.
Liquor ammoniæ carbonatis. L. } dr. 1—2.
Liquor alkali volat. mitis. D.

SECT. II. VEGETABILIA.

Anthemis nobilis. E. L. D.
Brit. Flos. Infus. dr. 2—4. ad. aq. lib. ½.

MATERIA MEDICA.

Asarum europæum. E.
Asarum. L. D.
Brit. Ital. Folia. Pulv. dr. ½—1.
Centaurium. L.
Insul. græc. Folia. infus. vel decoct.
Callicocca ipecacuanha.
Ipecacuanha. L. E. D.
India occid. Brasil. Radix. Pulv. gr. 15—25.
Vinum ipecacuanhæ. L. E. D. unc. 1—2.
Nicotiana Tabacum. E.
Tabacum. L.
America. Folia. Fum. Cataplasm.
Olea europæa. E.
Oliva. L. D.
Europ. merid. Fructus oleum express.
Ad Venena.
Scilla maritima. E.
Scilla. L. D.
Eur. merid. Rad. Pulv. gr. 4—10.
Acetum. Scillæ marit. E.
Acet. scillæ. L. D. unc. ½—1.
Sinapis alba. E.
Sinapi. L. D.
Brit. Seminis pulvis aqua commixt. dr. 1.

SECT. III. FOSSILIA.

Sulphas Cupri. E. L.
Cuprum vitriolat. D.
Brit. Solut. gr. 2—5.
Ad Venena.
Sulphuretum antimonii. E. L.
Antimonium. Stibium. D.
Brit.
Oxidum Antimonii. L.
Oxidum Antimonii cum Sulphur. vitrificat. E.
Antimonium vitrificatum. L.
Tartris Antimonii. E. } gr. 1—4. dos. repetit.
Antimonium tartarisatum. L.
Tartarum Stibiatum. D.
Vinum Tartrit. Antimon. E. unc. ½—1½.
Antimon. tartar. L.
Tartari stibiat. D. dr. 2—6.
Zincum E.
Sulphas Zinci E. L. } gr. 10—30.
Zincum vitriolatum. D.

CLASS II. EXPECTORANTIA.

SECT. I. VEGETABILIA.

Callicocca Ipecacuanha. Pulv. gr. 1. 3tia aut 4ta qu. hor.
Peripneumon. noth. Asthma.
Nicotiana Tabacum. Fumus.
Scilla maritima.
Acet. Scil. maritim. dr. 2—4.
Syrup Scill. maritim. E.
Oxymel Scillæ. L. D.
Tinctura Scillæ. L. gt. 10—dr. 1.
Pilulæ Scillæ. L. D. } gr. 10—15.
Scilliticæ. E.
Allium sativum. E.
Tinctur. Aristoloch. Serpentar. E. } dr. 3—6.
Serpentar. L.
Daphne Mezereum. E.
Mezereum. L.
Mezereon. D.
Eur septentr. Radicis cortex. Pulv. gr. 1.
Decoctum Daphnes Mezerei. E. unc. 1—2.
Syphil. Morb. cutan.
Dorstenia Contrajerva. E.
Contrajerva L.
Contrajerva. D.
Amer. merid. Rad. Pulv. gr. 30—40.
Decoct.
Febr. Cynanch.
Pulv. Contrajerv. comp. L. gr. 30—40. 4ta. qu. hor.
Fumaria officinalis.
Fumaria. D.
Brit. Herba. Infus.
Laurus Sassafras. E.
Sassafras. L. D.
Amer. sept. Ling. Rad. Cort. Decoct.
Salvia officinalis. E.
Salvia. D.
Eur. mer. Folia. Infus. ad libitum.
Sambucus nigra. E.
Sambucus. D.
Brit. Baccæ. Succus expressus.
Smilax Sarsaparilla. E.
Sarsaparilla. L. D.
Ind. Occ. Rad. Decoct.
Decoctum Smilac. Sarsaparill. E. } lib. 1.— in die.
Sarsaparill. L. D.
compos. L. Ibid.
Ad morbos cutan.
Solanum Dulcamara. E.
Dulcamara. E.
Brit. Stipites. Decoct.
Supertartris Potassæ. E.
Crystalli Tartari. D.
Gallia, &c. Pulv. Solut. scr. 1—dr. 1. sæpius in die.

B. *Fortiora.*

SECT. I. ANIMALIA.

Moschus moschiferus. E.
Moschus. D.
Asia. Mæteries prope Umbilic. collecta. Bol. Haust. gr. 10—20.
Mistura moschata. L. unc. 1—2.

SECT. II. VEGETABILIA.

Aconitum neomontanum.
Aconitum napellus. L. E. D.
Eur. mer. Folia. Pulv. Tinctur. gr. ½—2.
Succus spissat. Aconit napell. E. gr. ½—2.
Rheumat. Podagr. Paralys.
Guaiacum officinale. E.
Guaiacum. L D.
Ind. Occ. Ling.
Cort. Dec. Gum-resin. Pulv. Pil. Emuls. gr. 10—30.
Decoct. Guaiaci offic. comp. E. lib. ½—1. in die.
Ad. morb. cutan.
Tinctur. Guaiac. offic. dr. 2—4.
Ammoniæ. E. } dr. 1—3.
Guaiaci. L.
Volatilis. D.
Rheumatism.
Laurus Camphora. E.
Camphora. L. D.
Ind. Orient. Bol. Mist. gr. 5—20.
Mistura Camphorata. L. unc. 2—4.
Emulsio Camphorata. E. unc. 1—3.
Papaver somniferum. E.
Papaver. L.
Pap. album. D.
Opium.
Asia. Succus spiss. capsul. Pil. Pulv. gr. 1—2.
Tinctura Opii. L. E. D. gt. 25—50.
Tinct. Camphoræ Comp. L. dr. 2—6.

Ammoniata. E. dr. 1—1½.
Pulv. Ipecac. et Opii. E. } gr. 10—20.
compos. L. D.
Rhododendron Chrysanthum. E.
Siberia. Fol. Summit. Decoct. dr. 2—4. ad lib. 7.—unc. 1—2. bis in die.
Rheumat. Podagr.

SECT. III. FOSSILIA.

Sulphuretum Antimonii.
Liquor Antim. Tart. L. dr. 1.
Tartris Antimonii gr. ½. 6ta qu. hora.
Vinum Tartrit. Antimon. E. dr. 2.
Sulphuret. Antimon. præp. gr. 1—2.
Sulphur Stibii fuscum. D. Gr. 1—1½.
Oxidum Antimon. cum phosphate Calcis. E. } gr. 4—6. 4ta aut 6ta quaq. hor.
Pulvis Antimonialis L.
Stibiatus D.
Oxydum Antimonii. L. gr. 10—15.
Calx Stibii præcipitat. D.
Febres. Cynanchen. Pneumon. Rheumat. Variol. Rubeol. Scarlatin. Catarrh. Dysenter, &c.
Sulphur sublimatum.
Sulph. sublimat. lat E. } gr. 12—30.
præcipitat. L.
Allium. L. D.
Eur. merid. Rad. recens. dr. 1—2.
Syrupus Allii. L. coch. 1. subinde.
Ammoniacum E. L. D.
India. Gum-resin. Pil. Mist. gr. 10—20. dos rep.
Lac Ammoniaci. L. unc. 1—2. dos rep.
Arum maculatum. E.
Brit Rad. recens.
Conserv. Ari. L. dr. ½—1.
Colchicum autumnale. E.
Colchicum. L.
Brit. Rad. recens
Syrupus Colchici autumnal. E. dr. 2—unc 1.
Ferula Asa fœtida. E.
Asa fœtida. L. D.
Persia. Gum-resin. Pil. mist. gr. 10—15. dos rep.
Mist. Asæ fœtidæ. L. unc. 1—2 dos. rep.
Hyssopus officinalis.
Hyssopus. D.
Brit. Herba.
Marrubium vulgare. L.
Brit. Folia. Syrup.
Myrrha. L. E. D.
Arab. Abyssin. Gum-resin. Pul. Pil. gr. 10—dr. ½.
Pimpinella Anisum. E.
Anisum. L. D.
Asia. Semin. Infus.
Ol. volat. Pimpinell. Anisi. E.
Essent Anisi. L. gr. 2—6.
Polygala Senega. E.
Senega. L. D.
Amer. Rad.
Decoctum. Polygal. Senegæ. E. unc. 1—1½.
Cynanch. tracheal. Pneumon.
Styrax Benzoin. E.
Benzoinum. D. L.
Sumatra. Balsam.
Acidum Benzoicum. E. L.
Sal Benzoini. D. gr. 1—2. dos. repet.
Tinct. Benzoini comp. L. gt. 15—30.
Alcohol.
Spirit. rect. L.
Spirit. Vini rectificat. D.
Æther Sulphuricus. E. L. } forma vaporis.
vitriolicus. D.
Asthma.

SECT. II. FOSSILIA.

Liquor Antimonii tartarisati. L.
Sulphuretum Antimonii. E.
Tartris Antimonii. gr. ¼—½. subinde.
Vinum Tartrit. Antimonii. E. dr. 1—2.
Antimonii tartaris. D. gt. 30—d. 1.
Sulphuretum Antimonii precipitat. E*. L.
Stibii rufum. D. gr. 3—5.
Sulphur sublimatum. E.
Flores Sulphuris. L. D.
Sulphur sublimat. lotum. E. L. } gr. 15—dr. ½.
Flores Sulphuris loti. D.
Oleum Sulphuratum. L. D. E. gt. 10—20.
Petroleum Sulphuratum. E.
Asthma, &c.

* This should have been called *Hydrosulphuretum.*

CLASS III. DIAPHORETICA.

A. *Mitiora.*

SECT. I. ANIMALIA.

Murias Ammoniæ.
Aqua Carbonat. Ammoniæ. gt. 50.
Carbonas Ammoniæ. E. L. } gr. 5—10.
Alkali volatile mite. D.
Alcohol Ammoniatum. E.
Spirit. Ammoniæ. L. } gt. 30—dr. 1.
Alkali volatil. D.

SECT. II. VEGETABILIA.

Anthemis nobilis.
Infus. calid.
Centaurea Benedicta.
Ibid.
Myrrha.
Pulv.
Allium sativum.
Acidum Acetosum.
Acetum. L. D.
Serum lactis Aceto coacti.
Rheumatism.
Acidum Acetosum distillat. E.
Acidum aceticum. L.
Acetum distillatum. D.
Aqua Acetitis Ammoniæ. E. } dr. 3—6.
Liq. Ammoniæ acetatis. L.
Liq. Alkali volat. acetat.
Arctium Lappa. E.
Bardana. D.
Brit. Rad. Decoct.
Artemisia Abrotanum.
Eur merid. Folia. Infus.
Aristolochia Serpentaria. E.
Serpentaria. L. D.
Americ. Rad. Pulv. gr. 20—30. 6ta quaq. hor.
Hydrargyrum.
Hydrargyrus. L. E. D.
Hungaria, &c.
Hydrargyr. purificat. E. D.
Submurias Hydrargyr. E. L. } gr. 1. omn. nocte.
Hydrarg. muriat. mit. sublim. D.
Rheumat.

MATERIA MEDICA.

CLASS IV. DIURETICA.

SECT. I. ANIMALIA.

Lytta vesicatoria.
Lytta. L.
Meloe vesicatoria. E.
Cantharis. D.
Eur. mer. Pulv. gr. $\frac{1}{4}$.—1. 4ta vel 6ta qu. hor.
Tinctur. Meloes vesicat. E.
Lyttæ. L. gt. 10—20.
Ischur. Hydrop.

Oniscus Asellus. E.
Brit.

SECT. II. VEGETABILIA.

Asarum europæum. Rad. Decoct.
Hydrop.
Nicotiana Tabacum. Infus. unc. 1. ad lib. 1. gt. 60—80.
Hydrop. Dysur.
Scilla maritima. Pulv. gr. 1—2. bis terve in die.
Tinctur. Scilæ. gt. 20—30.
Hydrop.
Allium sativum.
Colchicum autumnale.
Syrup. Colchici. E. } dr. 1—4. bis terve in die.
Acetum Colchici. D. }
Hydrop.
Polygala Senega.
Decoct. Polygal. Seneg. unc. 1—1$\frac{1}{2}$.
Acidum Acetosum.
Acetis Potassæ. E. } ser. 1—4.
Potassæ acetas. L. }
Alkali vegetabile acetat. }
Hydrop. Icterum.
Daphne Mezereum.
Decoct. Daphn. Mezerei. unc. 1—2.
Smilax Sarsaparilla.
Decoct. Sarsaparill. com. ad libit.
Solanum Dulcamara. Decoct.
Supertartris Potassæ Solut. unc. $\frac{1}{2}$. in die.
Hydrop.
Allium Cepa.
Cepa. D.
Cult. Rad. recens ad libit.
Cissampelos Pareira.
Pareira brava. D.
Ind. Occid. Rad
Cochlearia Armoracia. E.
Armoracia. L.
Raphanus rusticanus. D.
Brit. Rad. recens. Infus.
Hydropes.
Copaifera Officinalis. E.
Copaiba. D. L.
Ind. Occ. Amer. Resin. Gutt. Emuls. gtt. 20—60.
Cynara Scolymus.
Cin. Scolymus. E.
Cinara. D.
Eur. mer. Folia. Succ. express. unc. $\frac{1}{2}$—1. bis in die.
Hydrop.
Digitalis purpurea. E.
Digitalis. L. D.
Brit. Fol. Pulv. gr. 1. bis in die. Infus. Decoct.
Hydrop.
Juniperus communis.
Juniperus. L. D.
Brit. Bacc. scr. 1—dr. $\frac{1}{2}$. Cacumen. Infus. ad libit.
Spir. Juniper. commun. } unc. $\frac{1}{2}$—1. subind.
comp. E. }
compos. L. D. }
Ol. Juniper. L. D.
commun. E.
Juniperus Lycia.
Olibanum. L. D.
India. Gum-resin.
Leontodon Taraxacum.
Taraxacum L. D. Rad.
Pinus Sylvestris. E.
Terebinthina vulgaris. L. D.
Brit. Resina et ol. volat. Gutt. Enema. Pill. gr. 15—20.
Ol. Volat. Terebinth rect. gtt. 20—30.
Pinus Larix.
Terebinthina Veneta. D.
Brit. Resina. Enema. Pill.
Pistachia Terebinthus.
Terebinthia Chia. L.
Spartium scoparium. E. L.
Spartium. L.
Genista. D.
Brit. Sem. Cacum. Decoct. ad libit.
Ulmus campestris. E.
Ulmus. L. D.
Brit. Cort. intern. Decoct.
Decoct. Ulmi. L. unc. 4—8. sæpius in die.
Ad morb. cutan.

SECT. III. FOSSILIA.

Hydrargyrum.
Murias Hydrargyri. E. } gr. $\frac{1}{8}$—$\frac{1}{4}$.
Hydrargyri oxymurias. L. }
Hyd. mur. corros. D. }
Ad morb. cutan.
Nitras Potassæ. E. L.
Nitrum. D.
India. Pulv. gr. 5—15.
Nitrum purificat. E. u. s.
Acidum Nitrosum. E. D. dr. 1—2.
Acidum nitricum. L. dr. $\frac{1}{2}$—1. ad Aquæ lib. 1. in die.
Spir. æther. nitros. L. E. D. gtt. 30—60. sæp. in die.

CLASS V. CATHARTICA.

A. *Mitiora.*

SECT. I. ANIMALIA.

Mel. L. E. D.
Brit.
Mel despumatum. E. L. D.

SECT. II. VEGETABILIA.

Anthemis nobilis.
Decoct Anthemid. nobil. E. Enema.
Olea europæa. Oleum. Enema.
Supertartris Potassæ. Pulv. dr. 2—4.
Tartris Potassæ. E. L. } dr. 2—6.
Alkali vegetabile tartarisat. D. }
Tartris Potassæ et Sodæ. E. } unc. 1—2.
Soda tartarisata. L. }
Sal Rupellense. D. }
Ad Febres. Phlegmas. Hæmorrhag. Comata. Colicam.
Choleram. Hydropes. Icterum.
Cassia fistula. E.

Cassia. L.
C. fistularis. D.
Ind. Or. et Occ. Fruct. Pulpa. ad libit.
Electuar. Cassiæ. L.
fistul. E. } unc. $\frac{1}{2}$—1.
C. Senna. E.
Senna. L. D.
Ægypt. Folia. Pulv. Infus.
Pulvis Sennæ composit. L. dr. $\frac{1}{2}$—1.
Febres, &c.
Confectio Sennæ. L.
Electuar. Cassiæ Sennæ. E.
Sennæ. D. } dr. 2—6.
Infusum Sennæ. Simpl. L.
Sennæ. D. } unc. 1—3.
Infus. Tamarind. Indic. cum Cass. Senna E. unc. 1—3.
Tinctura Sennæ. comp. E.
Sennæ. L. D. unc. $\frac{1}{2}$—$1\frac{1}{2}$.
Colicam.
Ficus Carica.
Carica. L. D.
Eur. mer. Fruct.
Fraxinus Ornus. E.
Manna. L. D.
Eur. mer. Succ. concret Solut. Elect. unc. 1—$1\frac{1}{2}$.
Syrupus Mannæ. D.
Prunus Domestica. E.
Pr. Gallica. L. D.
Eur. mer. Fruct. ad libit.
Rosa Damascena. D.
Rosa centifolia. E. L.
Eur. mer. Petala.
Aq. Rosæ centifolia. E.
Rosæ. L. D.
Syrup. Rosæ. centifol. E.
Rosæ. L. D.
Saccharum officinale. E.
Sacch. pur. L.
Sacch. non. purificat D.
Ind. Occid Succ. spissat.
Tamarindus Indicus E.
Tamarindus L. D.
Ind. Occ. Fruct. Pulpa. unc. 1—2. Infus.
Viola odorata. E.
Viola L. D.
Brit. Petala. Infus.
Syrupus Violæ odoratæ. E.
violæ. L. D.

SECT. III. FOSSILIA.

Sulphur sublimatum.
Sulphur. sublimat. lotum. dr. 1—2.
Ad Hæmorrhag. Morb. cutan Obstipat.
Sapo Hispanus E. D.
Sapo durus. L.
Hispan. Pil. Enema.
Icterum.

B. *Fortiora.*

SECT. I. ANIMALIA.

Cervus Elephus. E.
Cornu cervinum. D.
Cornua. L.
Phosphas Calcis.
Phosphas Sodæ. E. unc. 1—2.

SECT. II. VEGETABILIA.

Nicotiana Tabacum. Fum. Infus. pro Enemat.
Colicam Obstipat.
Sambucus nigra. Cortex interior Decoct. unc. 1. ad lib. 1. in die.
Hydrop.
Pinus sylvestris
Larix. } Terebinthina Enemat.
Aloe perfoliata. E.
Aloe Soccotrina.
A. Hepatica.
A. Cabalina. E. D.
Aloe spicata. L.
A. vulgaris. L.
Asia. Ind. Occ. Africa. Gum-resin. Pil. gr. 5—20.
Pulv. Aloes cum Canella. L. gr. 8—20.
Pilulæ Aloeticæ E. D.
Aloes compos. L. } gr. 10—20.
Aloes cum Colocynth. L. gr. 10—20.
Vinum Aloes Soccotrin. E. unc. 1—2.
Aloes. L. Aloctic. D. unc. $\frac{1}{2}$—1.
Tinctura Aloes socotrin. E.
Aloes. L. } unc. $\frac{1}{2}$—$1\frac{1}{2}$.
Dyspeps. Hypochondrias. Chloros.
Icter. Obstipat.
Bryonia alba. E.
Bryonia. D.
Brit. Rad. Decoct. Pulv. scr. 1—2.
Maniam. Hydrop.
Convolvulus Jalapa. E.
Jalapa. D. L.
Amer. Rad. Pulv. Bolus. gr. 15—30.
Pulvis Jalapæ compos. E. dr. $\frac{1}{2}$—1.
Extract. Rad. Convolvul.
Jalapæ. E.
Jalapæ. L. } gr. 5—12.
Tinctur. Convolvul. Jalapæ. E. dr. 3—6.
Tinctur. Jalapæ. L. Jalapæ. D. dr. 2—4.
Conv. Scammonium. E.
Scammonea. L.
Scammonium. D.
Asia. Resin. Pulv. Bol. Pil. gr. 5—15.
Pulvis Scammon. comp. L. gr. 8—15.
E. gr. 10—30.
Electuar. Scammonii. L. D. gr. 15—30.
Hydrop. Vermes.
Cucumis colocynthis. E.
Colocynthis. L. D.
Syria. Fructus medulla. Pil. Bol. gr. 2—5.
Extract. Colocynth. comp. L. gr. 5—15.
Gratiola officinalis E.
Gratiola. D.
Eur. mer. Herba. Radix. Decoct. Pulv. gr. 15—30.
Helleborus niger. E. D.
Melampodium.
Eur. mer. Rad. Pulv. Pil.
Extract. Hellebor. nigri. E. gr. 3—6
Hydrop.
Helleb. fœtidus.
Helleborus. L.
Brit. Rad. Fol. Decoct.
Iris Pseudacorus.
Iris. D.
Brit. Rad. recens. Succ. express. gtt. 60—80.
Hydrop.
Linum catharticum. D.
Brit. Herba. Infus. Pulv. dr. 1.
Momordica Elaterium. E.
Brit. Fructus recens.
Succ. spiss. Momordic.
Elater. E. } gr. 1—3.
Hydrop.
Rhamnus Catharticus. E.
Rhamnus. L.

Brit. Bacca. Succ. express.
Syrupus Rhamni cathart. E. L. dr. 6—12.
Hydrop.
Rheum palmatum. E.
Rheum. L.
Rhabarbarum. D.
Russia. Ind. Rad. Pulv. Bol. Pil. gr. 10—40.
Infusum Rhei palmati. E. unc. 1—3.
Vinum Rhei palmati. E. dr. 2—6.
Tinctura Rhei palmat. E. } unc. ½—1½.
Rhei. L. }
Rhei comp. L. unc. 1.
Rhei et Aloes. E. dr. 4—6.
Gentian. E. dr. 4—6.
Febres. Dysenter. Dyspeps. Hypochond. Icterum.
Ricinus communis. E. D.
Ricinus. L.
Ind. Occ. Seminum Ol. express. dr. 3—unc. 1.
Stalagmitis Cambogioides. E.
Cambogia. L.
Gambogia. D.
Ind. Gum-resin. Pil. g. 3—15.

SECT. III. FOSSILIA.

Sulphuretum Antimonii.
Tartris Antimonii gr. ¼. 4ta. quaq. hor.
Dysenter.
Hydrargyrum.
Submurias Hydrargyri. gr. 1—4.
Submurias Hydrargyri præcipitat. E. }
Hydrarg. mur. mit. præcip. D. } gr. 3—10.
Pilulæ Hydrargyri. E. D. L. }
Phlegmas. Comata. Colicam. Icterum. Obstipat. &c.
Nitras Potassæ.
Sulphas Potassæ. E. L. } dr. 1—2.
Alkali vegetabile vitriolat. D. }
Murias Sodæ. E.
Sodæ sulphas. L.
Alkali fossile muriatum. D.
Brit. Solut. unc. ½—1. Enem.
Sulphas Sodæ. E. } unc. 1—2.
Alkali fossile vitriolat. D. }
Sulphas Magnesiæ. E. L.
Magnesia vitriolat. D.
Brit. Solut. Enem. unc. ½—1½.
Dysenter, &c.

CLASS VI. EMMENAGOGA.

SECT. I. ANIMALIA.

Murias Ammoniæ.
Carbonas Ammoniæ.
Castor Fiber. E.
Castor. L. D.
Russia Amer. Mater. prope anum collecta.
Pulv. Pil. gr. 10—20. Enem. scr. 2—dr. 1.
Tinctura Castor. L. E. D. gtt. 20—dr. 1.
compos. E. gtt. 20—dr. 1.

SECT. II. VEGETABILIA.

Anthemis nobilis. Pulv. Infus. fort.
Extract. Anthem. nobil. E. }
Anthem. L. } gr. 15—30.
Chamæmel. D. }
Ammoniacum. Pil. gr. 10—scr. 1.
Ferula Asa fœtida. Pil. gr. 10—20.
Pil. Asæ fœtid. comp. E. gr. 15—30.
Tinctur. Asæ fœtid. L. E. D. dr. 1—2.
Alcohol. Ammoniæt. fœtid. E.
Spir. Ammoniæ fœtid. L. } gtt. 30—dr. 1.
Alkal. volatil. fœtid. D. }
Marrubium vulgare. Infus.
Myrrha.
Solanum Dulcamara.
Aloe perfoliata. Pil. gr. 1. ter in die.
Pulv. Aloes cum Myrrh. L. gr. 15—30.
Pil. Aloes comp. L. gr. 8—15.
E. gr. 5—12.
cum Asa fœtida. E. gr. 10. bis in die.
Tinctura Aloes compos. L. unc. 1.
Bryonia alba. Pulv. gr. 10—20.
Helleborus niger.
Tinctura Hellebor. nigr. E. dr 1. bis in die.
Rheum palmatum. Pulv. gr. 5—10. bis in die.
Pilul. Rhei compos. scr. 1—dr. ½.
Arnica montana. E.
German. Flores. Infus. scr. 1—2. in die.
Bubon Galbanum. E.
Galbanum. L. D.
Afric. Gum resin. gr. 10—20.
Pilul. Galbani compos. gr. 15—30.
Juniperus Sabina. E.
Sabina. L. D.
Asia. Fol. Pulv. gr. 10—15. bis in die.
Extract. Sabinæ compos. D. gr. 5—10. bis in die.
Pastinaca Opopanax. E.
Opopanax L. D.
Eur. mer. Gum-resin. Pil.
Rosmarinus officinalis. E.
Rosmarinus. L. D.
Eur. mer. Summitat. Infus.
Rubia tinctorum. E.
Rubia. L. D.
Brit. Zealand. Rad. Pulv. dr. ½—1. ter in die.
Ruta graveolens.
Ruta. L. D.
Eur. mer. Herba. Infus.
Extract. Rutæ. D.
Sagapenum. E. D.
Ægypt. Gum-resin. Pil.

SECT. III. FOSSILIA.

Hydrargyrum.
Submurias. Hydrargyri. gr. 3—5.
præcip. gr. 5—10.
Pilulæ Hydrargyr. gr. 10—20.
Ferrum. E. L. D.
Brit., &c.
* Carbonas Ferri. E. L. } scr. 1—dr. 1. bis in
Rubigo Ferri. D. } die.
Carbonas Ferri præcip. E. gr. 5—15.
Aqua Ferri Ærati. D. lib. ½—1. in die.
Sulphas Ferri. E. L. } gr. 1—5. bis in die.
Ferrum vitriolat. D. }
Vinum Ferri. L. dr. 2—4.
Tinctur. Muriatis Ferri. E. } gtt. 10—20. bis
Ferri muriat. D. } terve in die.

* The quantity of Carbonic Acid in these two preparations can scarcely entitle them to the name of Carbonate; they are rather Carbonated Oxyd, or what Dr. Thomson calls Oxy-carbonates.

CLASS VII. ERRHINA.

SECT I. VEGETABILIA.

Asarum europæum. Pulv.
Pulvis Asari europ. compos. E.

Nicotiana tabacum. Pulv.
Rosmarinus Officinalis. Pulv.
Iris florentina.
Ital. Rad. Pulv.
Lavandula spica. E.
Lavandula. L.
Lavendula. D.
Eur. mer. Flores. Pulv.
Origanum majorana. E.
Origanum. L.
Majorana. D.
Eur. mer. Folia. Pulv.
Teucrium marum.
Eur. mer. Herba. Pulv.
Veratrum album. E.
Veratrum. L.
Helleborus albus. D.
Eur. mer. Rad. Pulv.

SECT II. FOSSILIA.

Hydrargyrum.
Subsulphas Hydrarg. flav. E. } gr. i. bis in
Hydrargyr. vitriolat. D. } die.

CLASS VIII. SIALAGOGA.

SECT. I. VEGETABILIA.

Daphne Mezereum. Rad. masticat.
Odontalg. Paralys.
Amomum Zingiber. E.
Zingiber L. D.
Ind. Occ. Rad. masticat. Infus.
Odontalg.
Anthemis Pyrethrum. E.
Pyrethrum. L. D.
Eur. mer. Rad. masticat. Infus.
Pistacia lentiscus. E.
Mastiche. L.
Mastacia. D.
Eur. merid. Resina. Masticat.

SECT. II. FOSSILIA.

Hydrargyrum.
Hydrargyrum purificatum.
Submurias Hydrargyri. gr. i—2. bis in die.
Murias Hydrargyri. gr. ¼—½. bis terve in die.
Submurias Hydrarg. præcip. gr. 2. bis in die.
Pilulæ Hydrargyri. gr. 6—8. bis in die.
Oxidum Hydrargyri cinereum. E. } gr. 2. bis in
Pulvis Hydrargyri cinereus. D. } die.
Unguentum Hydrargyr. E. scr. 4. } alternis vel
fortius. L. D. scr. 2. } singulis
mitius. L. D. } noctibus.
Hydrargyr. oxyd. rubr. L. gr. ½. bis in die.
Acetis Hydrargyria. E. } gr. 2.
Hydrargyr. acetatum. D. }
Hydrargyrus sulphuret. rubr. L. externe.
Sulphuretum Hydrargyri nigrum.
Hydrargyr. sulphuratus niger. D.
Ad Febrem flav. Phrenit. Hydrocephalic. Ophthalm.
Cynanch. tracheal. Hepatit. chronic. Comata. Tetanum.
Hydrophob. Hydrop. Chloros. Siphilid. Lepr. Icterum. Psoram. Vermes.

CLASS IX. EMOLLIENTIA.

SECT. I. ANIMALIA.

Acipenser Huso. Sturio, &c. E.
Icthyocolla. L. D.
Russia. Decoct. ad libit.
Ovis Aries. E.
Sevum. L.
Sevum ovillum. D.
Brit. Ungt. Liniment. Cerat.
Physeter macrocephalus. E.
Cetaceum. L.
Sperma Ceti. D.
Sevum. Unguent, &c.
Sus scrofa. E.
Adeps suillum. D.
Adeps. L.
Brit. &c. Adeps. Unguent, &c.
Linimentum simplex. E.
Unguentum simplex. E.
Unguentum spermatis Ceti. D.
Cetacei. L.
Ceræ. D.
Ceratum simplex. E.
Spermatis Ceti. D.
Cetacei. L.
Cera alba. et flava. E. L. D.
Brit. Emuls. Unguent, &c.
Ad Diarrhœam. Dysenter. Ulcera.

SECT. II. VEGETABILIA.

Olea europæa. Liniment, &c. et interne.
Althea officinalis. E.
Althea. L. D.
Brit. Rad. Decoct. ad libit.
Decoct. Altheæ officinal. E. ad libit.
Syrupus Altheæ. E. L.
Amygdalus communis. E.
Amygdal. dulc. et amar. L. D.
Eur. mer. Fructus nucl. et Ol. express.
Emulsio Amygdali communis. E. } ad libit.
Lac Amygdalæ. D. }
Mist. Amygd. L.
Ad Febres. Pneumon. Catarrh, &c.
Oleum Amygdali communis.
Astralagus Tragacantha. E.
Tragacantha. L. D.
Eur. mer. Gummi. Pulv. Solut. ad libit.
Mucilago Astragali Tragacanthæ. E.
Mucilag. Gum. Tragacanthæ. D.
Pulvis Tragacanthæ comp. L. dr. i—4.
Avena sativa. E.
Avena. L. D.
Cult. Semen. Decoct. ad libit.
Febres. Pneumon. Catarrh. Dysenter. Diarrhoea, &c.
Cocos Butyracea. E.
Amer. merid. Oleum nucis fixum.
Externe.
Eryngium maritimum. E.
Eryngium. D.
Brit. Rad. recens.
Glycyrrhiza glabra. E.
Glycyrrhiza. L. D.
Eur. mer. Rad. Pulv. Decoct. Succ. spissat.
Trochisci Glycyrrhiz. E. D. ad libit. Catarrh, &c.
Hordeum distichon. E.
Hordeum. L. D.
Cult. Semen. Decoct. ad libit.
Ut Avena.
Decoctum Hordei distichi. E. }
compositum } ad libit.
L. }
Lilium candidum.
Lilium album. D.
Cult. Rad. recens. Catapl.

Linum usitatissimum. E. L.
Cult. Semen. Infus. Ol. express.
Oleum Lini usitatiss. E. unc. 1—3. Lini. L. D.
Pneumon. Nephrit. Dysenter. Hæmopt.
Malva sylvestris. E.
Malva. L. D.
Brit. Folia. Decoct.
Decoctum Malvæ comp. L.
Melissa officinalis. E.
Melissa. D.
Cult. Herba. Infus.
Mimosa nilotica. E.
Acacia. L.
Gummi Arabicum. D.
Arab. Senegal. Gum. Pulv. Solut. ad libit.
Mucilago Mimosæ niloticæ. E. } ad libit.
Acaciæ. L.
Arabici Gummi. D.
Emulsio Mimos. nilot. E.
Arabica. D.
Trochisci Gummosi. E.
Catarrh. Pneumon. Diarrh. Blenorrh.
Pyrus Cydonia. E.
Cydonia. L.
Cult. Semen.
Decoctum Cydoniæ. L.
Sarcocolla.
Asia succ. spissat.
Triticum hibernum. E.
Amylum. L.
Cult. Semen.
Mucilago Amyli. E. D. ad libit.
Vitis vinifera. E.
Vitis. D.
Fruct. sicc. Uvæ passæ.
Decoct. ad libit.

CLASS X. REFRIGERANTIA.

SECT. I. VEGETABILIA.

Acidum Acetosum dilutem ad libit. extern.
Acetis Potassæ. dr. 2. ad aq. lib. 1 in die.
Aque Acetitis Ammoniæ, unc. ½. freq.
Febres. Phlegmas.
Supertartris Potassæ solut. ad libit.
Tamarindus Indica.
Fructus ad libit.
Febres.
Berberis vulgaris.
Berberis. D.
Brit. Fructus.
Febres.
Citrus medica. E.
Limones. L.
Limonium. D.
Eur. mer. et Ind. Occ. Fruct succ. rec. et crystall.
Syrup. Citri. medic.
Limonii. D.
Limonis. L.
Febres.
Citr. Aurantium. E.
Aurantium. L.
Aurantia. D.
Eur. mer. Fruc. succ. recens.
Cochlearia officinalis. E.
Cochlearia. D. C.
Brit. Herba. et succus.
Succ. Cochlear. comp. E. ad libit.
Ad Scorbutum.
Morus nigra.
Morus. L.
Cult. Fructus.
Syrupus Mori. L.
Oxalis Acetosella,
Acetosella. D.
Brit. Herba. Succ.
Conserv. Acetosellæ. D.
Ribes nigrum. D.
Brit. Fruct.
Ribes rubrum. D.
Brit. Fructus.
Rosa canina. E. L.
Brit. Fruct.
Conserva Rosæ caninæ. E.
Confectio Ros. Canin. L.
Rubus Idæus. D.
Brit. Fructus.
Syrup. Fruct. Rub. Idæi. D.
Rumex Acetosa. E.
Acetosa. D. L.
Brit. Folia.
Sisymbrium Nasturtium. E.
Nasturt. aquatic. D.
Brit. Herba.
Ad Scorbutum.
Veronica. Beccabunga.
Brit. Herba.
Ad Scorbutum.

SECT. II. FOSSILIA.

Zincum.
Sulphas Zinci. Externe pro Lotione.
Nitras Potassæ.
Acid. nitrosum. dr. 1—2. ad Aq. lib. 1. in die.
Febres, &c.
Spirit. ætheris nitrosi E. } gtt. 30— dr. 1.
nitrici. L.
æthereus nitros. D.
Trochisci Nitrat. Potass. E.
Febres. Phlegmas. Hæmorrh. Maniam.
Murias Sodæ.
Acidum Muriaticum. gtt. 20—40 dilut. subind.
Febres.
Acidum Sulphuricum. E. L.
Vitriolicum. D.
Acidum Sulphuric. dilutum. E. L. } ut Ac. Mur.
vitriolic. dilut. D.
Febres. Hæmorrhag.
Plumbum. E. L. D.
Acetis Plumbi. E.*
Cerussa Acetata. D.
Plumbi Superacetas. L.
Interne ad Hæmorrhag. sed cautssime.
Aqua Lithargyr. acetati. L. } Externe.
Liquor Litharg. acetat. D.
Liquor Plumbi acetatis dilutus. L.
Liquor Litharg. Acetat. comp. D.
Unguent. Acetit. Plumb. E.
Cerat. Litharg. acetat. comp.
Ad Phlegmasias. &c.

* It is now found that there are two acetats of lead, an acetat which crystallizes in scales, and this salt, which containing an excess of acetic acid should be called superacetas plumbi, as it is in the new London Pharmacopœia.

CLASS XI. ASTRINGENTIA.

SECT I. VEGETABILIA.

Hæmatoxylum campechian. E.
Hæmatoxylum. L. D.
Americ. Lign. Decoct.

Extract. Lign. Hæmat. camp. E. Hæmatoxyl. L. D. } gr. 10—30.
Juglans regia.
Brit. Fruct. immatur. Decoct. Externe. Ulcera.
Kino. E. L. D.
Africa Pulv. Solut. gr. 15—30.
Tinct. Kino. E. D. dr. 1—2.
Diarrh. Dysent. Menorrh.
Mimosa Catechu. E.
Catechu. L. D.
India. Extract. lign. Pulv. Solut. scr. 1—2.
Infus. Mimos. Catechu. E. unc. ½—1½.
Tinct. Mimos. Catechu. E. Catechu. L. } dr. 1—3.
Elect. Catechu. E. Comp. D. } scr. 2—4.
Diarrh. Dysenter.
Anchusa. Tinctoria. E.
Anchusa. D.
Eur. Merid. Radix.
Boletus igniarius E.
Agaricus.
Brit. ad vulnera.
Pterocarpus Santolinum. E.
Santolinum rubrum. D.
India Lign.
Polygonum Bistorta.
Bistorta. L. D
Brit. Rad. Pulv. dr. ½—1. Decoct.
Potentilla reptans.
Brit. Fol.
Prunus Spinosa.
Prun. domestica. L.
Brit. Fruct. ad libit.
Pterocarpus Draco. E.
Pterocarpus. L.
Sanguis Draconis. D.
Amer. merid. Resina.
Punica granatum.
Granatum. L.
Flor. Balaust. D.
Eur. Merid Flor. Cort. Fruct.
Decoct. ad Gargar. ad libit.
Quercus cerris. E.
Gallæ. L. D.
Asia. Cyniphis nidus. Pulv. Inf. Ungt.
Quercus robur. E.
Quercus. L. D.
Brit. Cort. Decoct. Externe.
Scarlatin. Angin.—Uvulæ relaxat.
Hæmorrh. Menorrhag.
Rosa Gallica. E. L.
Ros. Rubr. D.
Eur. Merid. Brit. Petal. Inf. Conserv. ad libit.
Inf. Ros. Gallic. E. Rosæ. L. Rosar. D. } ad libit.
Conserv. Ros. gallicæ. E.
Rosæ. D.
Confectio Ros. Gall.
Syrup. Ros. Gall. E.
Mel. Ros. L. D.
Hæmorrh. Cynanchen, &c.
Tormentilla erecta. E.
Tormentilla. L. D.
Brit. Rad. Decoct. unc. ½—1.
Diarrhœa.

SECT. II. FOSSILIA.

Sulphas Cupri. gr. ½—1. bis turve in die.
Febr. Intermitt.
Injeot. Lot. Collyr.
Solut. Sulphat. Cupri. E.
Liquor Cupri Ammoniat. D.
Ophthalm. Gonorrhœa.
Zincum.
Sulphas Zinci. gr. 2—5. bis terve in die.
Febres Intermitt.
Solutio Acetit. Zinci. Collyr. Inject.
Ophthalm. Blenorrh.
Ferrum.
Tinctura Muriat. Ferri. gtt. 10—20. ter in die.
Menorrhag. cum debilitate.
Plumbum.
Acetis Plumbi. Lotion.
Oxydum album et Semivitreum.
Super-Sulphas Alumin. et Potass.
Sulphas Alumin. E.
Alumen. L. D.
Brit. Pulv. Solut. gr. 5—15.
Externe p. Gargar. et Lotione.
Sulphas Alumin. exsiccat. E.
Alumen exsiccatum. L.
Pulvis Sulphat. Alumin. comp. E. gr. 15—30.
Ophthalm.
Aqua Alumin. comp. L. pro Lotione.

CLASS XII. TONICA.

SECT. I. VEGETABILIA.

Anthemis Nobilis. Pulv. gr. 10—scr. 1. Infus unc. ½. ad lib. 1.
Centaurea benedicta. Infus.
Marrubium Vulgare. Infus.
Myrrha. Pulv. Pil. gr. 10—20.
Pulv. Myrrh. Comp. gr. 20. ad 30.
Dorstenia Contrajerva. Pulv.
Pulv. Contrajerv. Comp. L. gr. 20—30.
Vitis Vinifera.
Vinum rubrum Lusitanum.
Æsculus Hippocastanum. E.
Asia. Brit. Cort. Pulv. dr. ½—scr. 2.
Decoct. unc. 1. ad lib. 1.
Angustura. E. L. D.
Ind. Occident. Cort. Pulv. gr. 15—dr. ½. Inf.
Chironea. Centaur. Gentian. Cent. E.
Centaur. Min. D.
Brit. Summitat. Infus.
Cinchona officinalis. E.
Cinchona. lançifolia: cordifolia: et oblongifolia. L.
Cort. Peruv. D.
Peru. Cort. Pulv. dr. ½—2. Electuar. Enem dr. 1—3.
Inf. Cinchon. Off. E. Cort. Peruv. } unc. 2—4.
Decoct Cinchon. Off. Cort. Peruv. } unc. 3—6.
Tinct. Cinchon. Off. E. L. D. unc. ½—1.
Comp. L. D. dr. 3—6.
Ammoniat. dr. ½—1.
Extract Cinchon. Off. E. Cort. Peruv. L. D. } gr. 10—20.
Ad Febres. Rheumatism. Odontalg. Catarrh. Febril. Blenorrh. Dysenter. Erysipelat. Scarlatin. Hæmoptys. Menorrhag. Dyspeps. Hypochond. Astheniam. Spasmos. Hydrop.
Cinchona Caribbæ.
Insul. Caribb. Cort. (ut Cinchon Off.)
Calumba. L.
Columba. E. D.
Ceylon. Africa. Rad. Pulv. gr. 5—20. Inf. dr. 3. ad lib. 1.
Tinct. Columbæ. D. E.

Calumbæ. L.
Croton. Eleutheria. E.
Cascarilla. L. D.
Ind. Or. et Occident. Cort. Pulv. scr. 1—dr. 1.
Tinct. Cascarill. L. D. dr. 2—6.
Extract. Cascarill. D. gr. 10—20.
Gentiana lutæ. E.
Gentiana. L. D.
Eur. Merid. Rad.
Inf. Gentian. Comp. E. unc. ½—1.
D. dr. 6—12.
L. unc. 2—4.
Tinct. Gentian. Comp. E. L. dr. 2—6.
Vin. Gent. Comp. E. unc. 1—2.
Extract. Gent. L. D. lut. E. gr. 10—30.
Menyanthes Trifoliata. E.
Trifol. Paludos.
Brit. Rad. Exsiccat. Inf. unc. ½—lib. 1.
Quassia Excelsa. E.
Quassia. L.
Insul. Caribb. Lignum. Cort. Rad. Inf. dr. ½—2. ad lib. 1.
Qu. Simaruba. E.
Simarouba. L. D.
Ind. Occ. Cortex. Decoct. dr. 2. ad lib. 1.
Salix fragilis.
Salix. D.
Brit. Cortex. Pulv. scr. 2—4.
Decoct. unc. 2. ad lib.
Swietenia Mahagani. E.
Ind. Occ. Cortex. Pulv. Decoct. ut Cinchona.
Sw. Febrifuga. E.
Ind. Occ. Cort. ut supra.
Tanacetum. vulgare.
Tanacetum. D.
Brit. Fol. Flor. Infus.
Ad Vermes.

SECT. II. FOSSILIA.

Sulphas Cupri. gr. 1—3. bis terve in die.
Febr. Intermitt.
Ammoniaretum Cupri. E. } gr. ½.
Cuprum Ammoniatum. L. }
bis terve in die.
Pilulæ Ammoniar. Cupri. E. Pil. 1.
Epileps.
Zincum.
Sulphas. Zinci. gr. 2—5. bis terve in die
Febr. Intermitt. Epileps.
Solutio Sulphat. Zinc. E.
Externe pro Collyrio.
Oxydum Zinci. E.
Zinci oxydum. L. } gr. 1. bis terve in die.
Calx Zinci. D. }
Epileps.
Nitras Potassæ.
Acidum Nitrosum. gtt. 30—40.
Sulphas Magnesiæ. Solut. dr. 2. bis in die.
Ferrum.
Carbonas Ferri scr. 1—dr. 1.
Præcip. gr. 5—15.
A. Ferri ærati. D. lib. ½. bis in die.
Sulphas Ferri. gr. 1—5.
Vinum Ferri. dr. 2—6. bis in die.
Tinct. Muriat. Ferri. gt. 10—30. bis in die.
Sulphas Ferri exsiccat. E.
Oxydum Ferri rubrum. E.
Emplast. Occid. Ferri rub. E.
Ferri limatura purific. E.
Oxydum Ferri nigr. purific. E.
Murias Ammon. et Ferri. E. } gr.
Ferrum Ammoniatum. L. } 3—10.
Tinct. Ferr. Ammoniac. L. gtt. 10—30.
Tartris Ferri et Potassæ. E. } gr.
Ferrum Tartarisatum. L. } 10—30.
Tinct. Ferri acetati. D. gtt. 20—40.
Dyspeps. Hypochondrias. Asthm. Choream. Hydrop. Chloros. Phthis. Vermes.
Acidum Sulphuricum.
Acidum Sulphur. dilutum. gtt. 20—40.
Acidum Sulphuric. Aromaticum E. gtt. 10—20. bis terve in die.
Dyspeps, &c.
Argentum. L. E. D.
Nitras Argenti. E. L. } gr. ⅛—¼.
Argentum Nitratum. D. } bis in die.
Arsenicum. Oxyd. alb. vel. Acid. Arsen.
Oxydum Arsenici. E.
Solut.
Carbonas Barytæ. E.
Vid. Sulphas Barytæ.
Carbonas Calcis. E.
Creta. L. D.
Brit. &c.
Solutio, Muriatis Calcis. E. gt. 30—60. bis terve in die.
Ad Scrofulam, Schirrum, &c.
Sulphas Barytæ.
Terra ponderosa.
Brit.
Murias Barytæ. E.
Solutio Muriatis Barytæ. E. gt. 5—10. bis terve in die.
Ad Scrofulam, Schirrum, &c.

CLASS XIII. STIMULANTIA

SECT. I. ANIMALIA.

Murias Ammoniæ.
Aqua Ammoniæ. E. gt. 10—20.
Liquor Ammoniæ. L.
Liquor alkal. volat. caust. D.
Alcohol Ammoniatum. E. gt. 20—40.
Spiritus Ammoniæ. L.
Alkal. volat. D.
Carbonas Ammoniæ, E. gr. 5—10.
Ammoniæ Carbonas. L.
Alkali volatile mite. D.
Aqua Carbonat. Ammon E. gt. 20—dr. 1.
Liq. Ammoniæ Carbonatis. L.
Liq. alkal. volatil. mit. D.
Ammoniæ Carbonas L. gr. 10—20.
Oleum Ammoniatum, E.
Liniment. Ammon. fort. L.
Liniment. Ammon. Carbon. L.
Liniment. volatile. D.
Alcohol. Ammoniat. aromaticum. E. gt 20—dr. 1.
Spir. Ammon. arom. L.
Alcoh. volat. arom. D.
Spir. Ammon. succin. L.
Asphyx. Spasmos. Rheumatism, &c.
Moschus moschiferus.
Bol. Mist. gr. 10—scr. 1.
Mistura Moschata. unc. 1—2.
Ad Typhum. Gangraen.
Coccus Cacti. E.
Coccus. L.
Mexico.
Lytta vesicatoria.
Bol. gr. 1—3.
Tinct. Meloes vesicat. gt. 10—30.
Ungt. Infus. mel. vesicat. E.
Lyssæ. L.
Cantharid. D.
Pulv. mel. vesicat. E.

Ceratum. Lyttæ. L.
Empl. melo. vesicat. E.
Lyttæ. L.
Cantharidis. D.
mel. vesicat. com. E.
Ad Synoch. Typh. Phrenit. Cynanch. Pneumon. Gastrit. Enterit. Rheumatism. Odontalg. Variol. Scarlatin. Apoplex. Paralys. Choream. Asthm. Dyspnœam. Pertuss. Colicam. Hysteriam. Hydrophob. Maniam. Icterum. Caligin. Amauros. Ischuriam.

SECT. II. VEGETABILIA.

Sinapis alba.
Semen et ejusd. Pulvis. dr. 1—4.
Cataplasma Sinapeos. D.
Sinapis. L.
Rheumatism. Paralys.
Allium sativum.
Rad. recens.
Arum maculatum.
Rad recens. Bol. Elect. Emuls. gr. 10—20. bis in die.
Rheumatism.
Pimpinella Anisum.
Semen.
Ol. volat. Pimpin. Anisi. gtt. 2—6.
Dyspeps. &c.
Styrax Benzoin.
Balsamum.
Acidum Benzoicum. gr. 1—3.
Tinctura. Benzoini comp. L. gtt. 10—20.
Alcohol.
Æther Sulphuricus. L. dr. ½—dr. 1.
Ad. Morb. spasmod.
Æther Sulphuric. cum. Alcohole. E.
Liquor ætherus. vitriolicus. D. gtt. 15—30.
Æther Sulphur. cum Alcohol. comp. E. gtt. 15—30.
Acidum Acetosum.
Acidum Acetosum forte. E.
Externe per nares in Syncope, Asphyxia, &c.
Acidum Acetosum Camphoratum. E.
Ut supra.
Acetum Aromaticum. E.
Ut supra.
Aristolochia Serpentaria.
Rad. Pulv. Bol ser. 1—2.
Tinctura Aristol. Serpentar. dr. 2—6.
Typh. Dyspeps.
Daphne Mezereum.
Rad.
Decoctum Daphn. Mezerei. unc. 1—2. sæp. in die.
Ad morbos cutan. Syphil.
Guaiacum officinale.
Lign. Decoct. unct. 1. ad lib. 1. Resin Pulv. Emuls. gr. 10—20.
Rheumatism. Syphil. Morb. cutan.
Decoctum Guaiac. officin. unc. 4—8. bis in die.
Tinctura Guaiac. offic. dr. 2—4.
ammoniat. dr. 1—3.
Papaver somniferum.
Opium. gr. ¼—1. dos. repetit.
Tinctura Opii gtt. 5—20. simili modo.
Camphorat. dr. 1—4.
Ammoniat. dr. ½—1.
Typh. Dyspeps. Tetan. &c.
Cochlearia Armoracia.
Rad. rec. Subst. Infus.
Spirit Armoraciæ comp. L. unc. 1—2.

Paralys. &c.
Copaifera officinalis.
Balsam. gtt. 15—30.
Pinus { Sylvestris. Larix.
Ol. vol. Pini puriss.
Ungt. Resin. flav. D.
Resinosum. E.
Cerat. Resin. L.
Empl. Ceræ. D. comp. L.
Ungt. Picis. L. D.
Empl. Picis. Burgund.
Externe ad Ulcera. &c.
Arnica montana.
Rad. Pulv. scr. 1—2.
Typh. Paralys.
Bubon Galbanum.
Pilul. Galbani comp. gr. 15—20.
Emplastrum Galbani comp. E.
Lithargyri compos. L.
Juniperus Sabina.
Oleum Juniper. Sabinæ. gt. 1—4.
Pastinaca Opoponax.
Pil. gr. 2—5.
Veratrum album.
Unguentum Hellebori albi. L.
Decoct. Veratri. L.
Amomum Zingiber.
Rad. Pulv. gr. 5—20.
Podagr. retroced. vel atonic. Paralys. Dyspeps, &c.
Syrupus Amom. Zingib.
Tinctura Amom. Zingib. E. dr. 2—4.
Acorus Calamus. E.
Calamus. L.
Brit. Rad. Pulv.
Amomum repens. E.
Cardamomum. L.
Cardamomum minus. D.
India. Semen.
Tinctura Amomi repent. E. } dr. 2—4.
Cardamomi. L. D. }
comp. L. dr. 2—4.
Amyris Gileadensis.
Asia. Resina.
Amyris Elemifera.
Elemi. L. D.
Amer. mer Resina.
Unguentum Elemi. comp. L.
Anethum Fœniculum. E.
Anethum. L.
Fœniculum. D.
Brit. Sem. Decoct. Enem.
Oleum volatil. Fœnicul. dulc. D.
Aqua. L. unc. 1—3.
Anethum graveolens.
Eur. mer. Semen.
Aqua Anethi. L.
Angelica Archangelica. E.
Angelica. D.
Cult. Rad. Semen.
Apium Petroselinum. E.
Cult. Rad. Semen.
Arbutus Uva Ursi. E.
Uva Ursi. L. D.
Eur. merid. Folia. Pulv. scr. 1—dr. 1. Infus.
Ad Calculum.
Artemisia maritima.
Absinthium. L.
Brit. Cacumen.
Canella alba. E. D.
Canella.
India Occid. Cortex. Pulv.
Carbo Ligni.

Delphinium Staphisagria.
Staphisagria. L. D.
Eur. Mar. Sem. Pulv.
Capsicum annuum.
Piper Indicum. D.
Ind. Occ. Capsulæ. Pulv. gr. 2—6. Infus
Ad Febres. Scarlatinam anginosam.
Carum Carvi. E.
Carum. L.
Carui. D.
Cult. Semen. Decoct.
Oleum Carui. L. gtt. 1—4.
Spiritus Cari Carvi. E. } unc. ½—2.
Carui. L. D. }
Dyspeps. Colic.
Cistus Creticus.
Syria. Resina.
Citrus Aurantium.
Aurantium. L.
Aurantium Hispalense. D.
Eur. merid. Flores. Cortex. Fruct. Infus.
Oleum volat. Citri Aurant. E. gtt. 2—6.
Aqua Citri Aurantii. E. unc. 1—3.
Tinctura Aurantii L. D. unc. ½—1½.
Syrupus Citri Aurantii. E.
Cort. Aurantii. D.
Confectio Aurantii. L.
Conserva Citri Aurantii. E.
Cort. Aurantii. D.
Coriandrum sativum. E.
Coriandrum. L. D.
Eur. merid. Semen. Pulv. Infus.
Crocus sativus. E.
Crocus. L. D.
Cult. Stigmata. Infus.
Syrupus Croci. L
Tinctura Croci. E. dr. 2—4.
Cuminum Cyminum.
Cuminum. L.
Ægypt. Sicil. Semen. Decoct.
Emplastrum Cumini. L.
Curcuma longa.
India. Radix. Pulv.
Daucus Carota. E.
Daucus. L.
Brit. Semen. Radix. Cataplasm.
Dianthus Caryophyllus. E.
Caryophyllum rubrum. D.
Italia. Petala. Infus.
Eugenia caryophyllata. E.
Caryophyllum aromaticum. D.
Caryophyllum. L.
Insul. Molucc. Floris germen.
Oleum volat. Caryophylli aromatici. gtt. 1—2.
Odontalg. Colic.
Hypericum perforatum.
Brit. Flos.
Inula Helenium.
Enula campana. D.
Brit. Radix.
Juniperus Lycia. E.
Olibanum.
Asia. Gum-resin. Pilul.
Kaempferia rotunda. E.
India. Rad. Pulv.
Lavandula Spica. E.
Lavandula. D. L.
Cult. Flores.
Oleum volat. Lavandulæ Spicæ. E.
Lavandulæ. L.
Spiritus Lavandulæ Spicæ. E.
Lavandulæ. L.
Spiritus Lavandulæ comp. E. L. dr. ½—1.
Laurus Cinnamomum. E.
Cinnamomum. L. D.
Ceylon. Cortex. Pulv. gr. 5—15. Infus.
Ol. essent. Cinnamom. D. gt. 1—2.
Aqua Laur. Cinnam. E. unc. 1—3.
Cinnamom. L. D.
Spir. Laur. Cinnamom. E. unc. ½—1½.
Cinnamom. L. D.
Tinct. Laur. Cinnamom. E. dr. 2—4.
Cinnamom. L. D.
Cinnamom. comp. E. dr. 1—2.
Cinnam. comp. L. D.
Pulv. Aromaticus. E. D. } gr. 10—20.
Cinnam. comp. }
Electuar. Aromat. E. D. gr. 10—30.
Confect. Aromat. L.
Laurus Cassia. E.
Cassia lignea. D.
India. Cortex. Pulv. &c. Flor. nondum. explicit
Aqua Lauri Cassiæ. E. unc. 2—4.
Laurus nobilis. E.
Laurus. L. D.
Cult. Folia. Bacc. et Oleum Bacc. Externe.
Lobelia syphilitica. E.
Virgin. Rad. Pulv.
Ad Siphilidem.
Melaleuca Leucodendron. E.
Cajeputa.
Insul. Molucc. Ol. essential. gtt. 1—4. et Externe.
Rheumatism.
Mentha viridis. E. L.
Mentha sativa. D.
Cult. Herba. Infus.
Oleum Menthæ viridis. L. gtt. 2—6.
Aqua Menthæ sativæ. D. unc. 2—6.
viridis.
Spiritus Menthæ sativæ. L. unc. 1—2.
Colic.
Mentha Piperita. E. L.
M. Piperitis. D.
Cult. Herba. Inf.
Aq. Menthæ piperitæ. E. L. unc. 1—4.
piperitidis. D.
Ol. volat. Menthæ piper. E. gt. 1—3.
Menth. piper. L.
essent. M. piperitid. D.
Spir. Menthæ piperit. E. dr. 2—6.
piperitid. L. D.
Mentha Pulegium. E.
Pulegium. L. D.
Cult. Herba Infus.
Aq. Menth. Pulegii. E. unc. 2—4.
Pulegii. L. D.
Ol. volat. Menth. Puleg. E. gt. 1—3.
essent. Pulegii. L. D.
Spirit. Pulegii. L. unc. 1—2.
Myristica Moschata. E.
Myristica. L.
Nux Moschata. D.
Insul. Molucc. Nucleus. Pulv. Ol. volatil. et express. gtt. 1—3.
Spiritus Myristic. Moschat. E. }
Nucis moschatæ. D. } dr. 2—6.
Myristicæ. }
Myroxylon Peruiferum. E.
Balsamum Peruvianum. L. D.
Amer. merid. Balsam. gtt. 10—30.
Tinctura Balsami Peruviani. dr. 1—2.
Myrtus Pimenta. E.
Pimenta. L.
Pimento. D.
Jamaica. Bacca.
Aq. Myrti Piment. E. unc. 2—6.
Piment. L.
Ol. volat. Myrt. Pim. E. gt. 1—3.

Spir. Myrt. Piment. E. unc. 1—2.
Piment. L. D.
Origanum vulgare. E.
Origanum. L. D.
Brit. Herba.
Oleum Origani. L.
Ad Odontalg.
Panax quinquefolium.
China. Radix. Pulv.
Parietaria officinalis.
Brit. herba.
Pinus balsamea. E.
Balsamum Canadense.
Americ. septent. Resina liquida.
Piper nigrum. E. L. D.
India Fruct.
Piper Cubeba.
Java Fruct.
Pip. longum. E. L. D.
Fruct.
Pistacia Terebinthus.
Terebinthina Chia. L.
Insul. Chio. et Cyprus.
Rhus Toxicodendron. E.
Amer. Folia Pulv. gr. $\frac{1}{2}$.—bis terve in die.
In Paralysin.
Styrax officinale. E.
Styrax L. D.
Eur. merid. Balsam.
Styrax purificata. L. D.
Toluifera Balsamum. E.
Balsamum Tolutanum. L. D.
Amer. merid. Balsam. Troch.
Tinctura Toluiferæ Balsam. E.
Syrupus Toluiferæ Balsam. E.
Tolutan. L.
Trigon[illegible] Fœnum græcum.
Gall[illegible]a. Catapl. Fotus.
Urtica [illegible]
Urtica. L.
Brit. Herb. rec. Externe. Pulv. scr. 1—dr. 1.
Paralys. Febr. Intermitt.
Wintera aromatica. E.
Amer. merid. Cortex. Pulv.

SECT. III. FOSSILIA.

Hydrargyrum.
Vid. Sialagoga.
Ungt. Oxid. Hydr. rubr. E.
Nitrat. Hydrarg. E.
Hydrarg. nitrat. L.
Un. nitrat. Hydrarg. mitius. E.
Nitras Potassæ.
Acidum nitrosum. dr. 1—in die.
Unguentum Acidi nitrosi. E.
Ad morb. cutan.
Sapo Hispanus.
Tinctura Saponis. E.
Linimentum Saponis compos. L.
Saponaceum. D.
Rheumatism, &c.
Tinctura Saponis cum Opio. E.
Ceratum Saponis. L. D.
Emplastrum Saponis. L.
Saponaceum. E. D
Murias Sodæ.
Murias Sodæ exsiccatus. E.
Externe in Asphyx.
Acidum Sulphuricum.
Externe in Ungt. ad morb. cutan. et interne.
Oxidum Arsenici.
Externe in Carcinom.
Bitumen Petroleum. E.
Petroleum. L.
India.
Oleum Petrolei.
Sub-boras Sodæ.
Boras Sodæ. E.
Borax. D.
India Pulv. Linctus.
Ad Aphthas.
Sub-acetis Cupri. E.
Ærugo. L. D.
Collyr. Ungt.
Unguentum Sub. acetit. Cupri. E.
Calx. E. L.
Calx viva. D.
Linimentum Aquæ Calcis. E.
Ad Tineam Capitis.
Nitras argenti.
Externe pro escharchio.

CLASS XIV. ANTISPASMODICA.

SECT. I. ANIMALIA.

Murias Ammoniæ.
Vid. Stimulantia.
Moschus moschiferus.
Pulv. Bol. scr. 1—dr. $\frac{1}{2}$.
Cervus Elaphus.
Cornu Cervin. rectificat. D. gtt. 15—30.
Castor Fiber. Pulv.
Tinctur. Castor. gtt. 30—dr. 1.
compos. gtt. 20—40.
Ad Hysteriam, &c.

SECT. II. VEGETABILIA.

Cephælis Ipecacuanha.
Pulv. gr. 3—6.
Nicotiana Tabacum.
Fum.
Colic.
Ferula Asa fœtida.
Pilul. gr. 10—scr. 1.
Alcohol Ammoniat. fœtid. E. }
Spiritus Ammoniæ fœtid. L. } gtt. 15—30.
Spt. Alkali. volatil. fœtid. D. }
Pilulæ Asæ fœtid. comp. E.
Emplastr. Asæ fœtid. E.
Hysteria, &c.
Alcohol.
Æther Sulphuricus. dr. $\frac{1}{2}$—2.
Laurus Camphora.
Emulsio Camphorata, unc. 2—3.
Mistura Camphorata, unc. 2—3.
Tinctura Camphoræ. E.
Spirit. Camphoratus. D. Externe.
Camphoræ. L.
Liniment. Camphor. com. L.
Camphorat. D.
Papaver somniferum.
Opium. Pil. Mist. gr. 1—
Liniment. Enem.
Tinct. Opii.
camphoræ. comp. L. dr. 1—4.
ammoniata. E. dr. 1.
Elect. Opiatum. gr. 5.
Pilul. Saponis cum opis. L.
Opiatæ. gr. 10.
Bubon Galbanum.
Pilul.
Pilul. Galbani comp. L. gr. 15—40.
Hysteria.
Vitis vinifera.
Vinum rubrum Lusitanum. lb. 1—in die.
Ad Tetanum.
Citrus Aurantium
Fol. Pulv. dr. $\frac{1}{2}$.
Convuls.

MATERIA MEDICA.

Artemisia Absinthium.
Absinthium. L.
Brit. Cacumen. Oleum. volat.
Carbonas Potassæ impurus. E.
Cineres clavellati. D.
Aqua potassæ. E.
Liquor potassæ. L.
Lixivium alkali vegetab. caust. D.
Externe in Balneo ad Tetanum.
Cardamine pratensis. E.
Cardamine. L.
Brit. Flores. Pulv. dr. ½. bis in die.
Ad Choream, &c.
Conium maculatum. E.
Conium. L.
Cicuta. D.
Brit. Folia. Pulv. gr. 1.
Succus spissat. Conii maculat. E.
Extract. Cicutæ. D.
Conii. L.
Fuligo Ligni Combusti. D.
Hyster.
Hyoscyamus niger. E.
Hyoscyamus. D.
Brit. Folia. Semen.
Succus spissat. Hyoscyam. nigri. E. gr.
Valeriana officinalis. E.
Valeriana. L. D.
Brit. Radix. pulv. scr. 1—dr. 1—bis terve in die.
Tinctura Valerianæ. L. dr. 2—4.
Ammoniat. E. dr. 1.
Extract. Valerian. sylvestr. resinos. D.
Ad Hysteriam, &c.

SECT. III. FOSSILIA.

Hydrargyrum.
Vid. Sialagoga.
Bitumen Petroleum. E.
Petroleum. L. D.
Italia.
Oleum Petrolei. L.
Succinum. L. E. D.
Oleum Succini. E. L.
purissimum. E. } gtt. 10—20.
rectificat. D. }
Sal Succini. D.
Spiritus Ammoniæ. succinat. L. gtt. 30.

CLASS XV. NARCOTICA.

VEGETABILIA.

Nicotiana Tabacum.
Vinum Nicot. Tabaci. E. gt. 30.
dr. 1 bis in die.
Aconitum neomontanum.
Succus spissat. Aconit, napel gr. ½—2.
Papaver somniferum.
Tinct. Opii. gt. 25
Camphorat. dr. 2—6.
Syrup. Opii. D.
Extr. Papaver. somnifer. E.
Pulv. Opiat. E. gr. 10.
Elect. Opiatum. E. gr. 43.
Confect Opii. L. gr. 36.
Pil Opii. E. gr. 5.
Opiatæ. E. gr. 10.
Ad Febr. intermittent. Typh. Rheumatism. Odontalg. Catarrh. Dysenter. Ophthalm. Enterit. Scarlatin. Variol. Rubeol. Hæmoptys. Menorrhag. Hæmorrh. Tetan. Choream. Epileps. Pertuss. Asthmat. Hydrophob. Angin. pectoris. Hysteriam. Phthis. Icter. Diabet.
Rhododendron Chrysanthum.
Folia. Vid. Diaphoretica.
Digitalis purpurea.
Pulv. gr. 1.
Tinctura Digital. purpur. gtt. 10—
Ad Synocham. Phrenit. idiopath et Hydrocephalic. Pneumon. Phthisin, &c.
Arnica montana.
Flores. Pulv. gr. 5.
Paralys. Convuls. Amauros.
Rhus Toxicodendron.
Folia. Vid. Stimulantia.
Conium maculatum.
Pil Pulv. gr. 1.
Succus spissat. Conii maculat. gr. 2.
Hyoscyamus niger.
Succus spissat. Hyoscyam. nigr. gr. 2—4.
Tinctura Hyoscyami nigr. E. dr. 1.
Atropa Belladonna. L. D.
Belladonna. L. D.
Brit. Fol. Pulv. gr. 1.
Datura Stramonium. E.
Brit. Fol. Pulv. gr. 1.
Humulus Lupulus.
Humulus. L.
Extractum gr. v—20.
Tinct. dr. ½—1.
Lactuca viroso. E.
Brit. Fol a. Succ. spissat. gr. 1.
Ad Hydrop.
Papaver Rhœas. E.
Rhœas. L.
Brit. Petula. Infus.
Syrupus Rhœados. L.
Sium nodiflorum.
Brit. Herba.

CLASS XVI. ANTHELMINTICA.

SECT. I. ANIMALIA.

Murias Ammoniæ.
Aqua Carbonatis Ammoniæ.
Emuls.

SECT. II. VEGETABILIA.

Anthemis nobilis.
Pulv. scr. 1.—dr. ½—bis in die.
Lumbric.
Nicotiana Tabacum.
Enema.
Ascarid.
Olea Europea.
Oleum Enema. Emuls.
Allium sativum.
Rad. recens. Subst. ad libitum.
Ferula Asa fœtida.
Gum. Resin. Enema. scr. 1—2.
Convolvulus Jalapa.
Rad. Pulv. gr. 10—30.
Convolvulus Scammonium.
Pulv.
Pulvis Scammonii compositus.
Helleborus fœtidus.
Fol. Succ. express.
Lumbric.
Rheum palmatum.
Pulv. gr. 5—10. omni nocte.
Ricinus communis.
Oleum express. unc. ½—1. Enem. unc. 1—2.
Stalagmitis Cambogioides.

Pil. gr. 5—15.
Ad Tæniam.
Ruta graveolens.
Infus. Enema.
Oleum volat. Rutæ. gtt. 3—6.
Juglans regia.
Cortex Fructus immatur. Extract.
Tanacetum vulgare.
Flor. Pulv. scr. 1—2.
Valeriana officinalis.
Rad. Pulv. dr. 1.
Artemisia Santonica. E.
Santonicum. D.
Asia. Semen. Pulv. dr. $\frac{1}{2}$—scr. 2. bis in die.
Dolichos pruriens. E.
Ind. Occ. Pubes leguminum. Elect. gr. 10—30.
Geoffræa inermis. E.
Jamaica. Cortex. Decoct. Syrup.
Decoctum Geoffr. inerm. E. unc. 1—2. omni mane.
Polypodium Filix mas. E.
Filix. L.
Filix mas. D.
Brit. Rad. Pulv. dr. 2—3.
Ad Tæniam.
Spigelia marilandica. E.
Amer. Rad. Pulv. gr. 10—scr. 2.

SECT III. FOSSILIA.

Hydrargyrum.
Amalgama Stanni.
Submurias Hydrargyri. gr. 3—10.
Murias Sodæ
Pulv. dr. $\frac{1}{2}$—unc. 1.
Ferrum.
Carbonas Ferri gr. 10—30.
Sulphas Ferri gr. 3—10.
Ferri limatura purificat. dr. $\frac{1}{2}$—1.
Tartris Ferri et Potassæ. gr 10—scr. 1.
Calx. E. L.
Calx recens usta. D.
Aqua Calcis. L. E. D. Enema. lib. $\frac{1}{2}$—1.
Ad Ascarid.
Stannum. L. E. D.
Stanni Pulvis. unc. $\frac{1}{2}$—1.
Ad Tæniam, et Lumbric.

CLASS XVII. ABSORBENTIA.

SECT. I. ANIMALIA.

Cerous Elaphus.
Phosphas Calcis. E. } gr. 10—20. bis in die.
Cornu ushim. L. }
Ad Rachit.
Cancer Astagus et Pagurus. E.
Murias Ammoniæ.
Aq. Ammoniæ. gtt. 10—15.
Carbonas Ammoniæ. gr. 5—15.
Aq. Carbonatis Ammon. gtt. 20—40.
Sal. Cornu Cervi. gr. 5—12.
Ad Cardialg, &c.
Isis nobilis. E.
Ostrea edulis. E.
Brit. Testæ Pulv.
Testæ prepar. L.
Spongia officinalis. E.
Spongia. L.
Spongia usta. L. scr. 1—2.
Ad Scroful.

SECT. II. VEGETABILIA.

Carbonas Potassæ impuras.
Aqua Potassæ.
Potassa. E. Externe.
Potassa fusa. L.
Alkali vegetabile caust. D.
Potassa cum Calce. E. L.
Causticum mitius. D.
Carbonas Potassæ. E. gr. 10.
Potassæ Subcarbonas. L.
Alkali vegetabile mite.
Carbonas Potass. puriss. E. gr. 10.
Aqua Potass. Carbonat. L. gt. 30.
Lixivium mite. D.
Aqua super-carbonat. Potass. E. unc. 4, sæp. in die.
Liquor Alkal. veget. mitiss. D.
Ad Cardialg. Calculum, &c.

SECT. III. FOSSILIA.

Sulphur sublimatum.
Sulphuretum Potassæ. E. L. } gr. 10.
Alkali vegetabile sulphurat. D. }
Ad Venena metallica.
Hydrosulphuretum Ammoniæ. E. gtt. 5—10.
Ad Diabeten.
Sulphas Magnesiæ.
Magnesiæ Carbonas. L. dr. $\frac{1}{2}$.
Magnesia Alba. D.
Magnesia. E. scr. 1—dr. 1.
Magnesia Usta. D.
Magnesia. L.
Ad Cardialgiam.
Calx.
Aqua Calcis. E. L. D.
Ad Dyspeps.
Ad Diarrhœam, &c.
Carbonas Calcis. E.
Creta. L. D.
Carbonas Calcis præparat. E. gr. 15—dr. 1.
Creta præparata. L. D.
Pulv. Carbonat. Calc. com. E. gr. 15—30.
Cretæ composit. L.
Trochisc. Carbonat. Cretæ. E. ad libit.
Potio Carbonat. Calcis. unc. 2—3.
Mistura Cretæ. L.
Aqua Æris fixi. D. lib. $\frac{1}{2}$—1 in die.
Ad Cardialgiam. Calculum.
Carbonas Sodæ impurus. E.
Soda impura. L.
Alkali fossile mite. D.
Carbonas Sodæ. E. } gr. 10—30.
Sodæ Subcarbonas. L. }
Aqua super-carbonatis Sodæ. E. lib. $\frac{1}{2}$—1. in die.
Ad Calculum, &c.
Carbonas Zinci impurus. E.
Calamina. L. D.
Brit. Ung. et Collyr.
Oxydum Zinci impurum. E.
Brit. Ung. et Collyr.

To render this article the more complete, we shall add a few remarks upon the nature, use, and indications of the respective classes in the preceding system, as they may be inserted with more propriety here than in any other part of this work.

I. *Of Emetics.*

These may be regarded as irritative, or evacuant, or both. Of the first we have instances in the sul-

phuret of antimony, the tartar emetic of popular language, sulphat of zinc, or white vitriol, and the sulphat of copper, or blue vitriol. Of the second we have instances in ipecacuanha and squills; of the third in tobacco and foxglove.

From the use of emetic medicines the following direct effects are produced.—They excite sickness, nausea, and their common attendants. They produce the action of vomiting itself. They occasion sudden and opposite changes in the circulation.

They increase the secretion or the discharge of secreted matter from the various glands which prepare fluids to be deposited in the alimentary canal.

The changes induced in the system in consequence of the primary effects of emetics are:—The evacuation of the contents of the stomach, and, in some degree, of the upper part of the intestinal tube: free circulation through the stomach, intestines, and glands, whose secreted matters are acted upon: general agitation of the body: a commotion of the nervous system: a particular affection of the surface of the body.

The indications which emetic medicines are capable of fulfilling may be derived from the following sources: their producing agitation of the body, whence they may be employed to restore uniform circulation. To promote diminished lymphatic absorption. To remove obstructions in the sanguiferous system. From their producing evacuation by vomiting: whence they may be used to discharge noxious matters taken in by the mouth. To discharge morbid accumulations of secreted matters lodged in the stomach. To evacuate serous accumulations from the affection of the nervous system which they occasion: whence they may be employed to restore excitement to the nervous system in general, and obviate inordinate affections of the nervous energy. These illustrations may be illustrated and confirmed by attention to the use of emetics when employed in cases of fever, dysentery, pulmonary consumption, jaundice, apoplexy, dropsy, and poisons.

In the use of emetics, we ought to pay attention to the circumstances of infancy, old age, pregnancy, delicacy of habit, and plethora. The circumstances chiefly to be regarded with respect to the regimen necessary for this class are, the state of the stomach when the emetic is exhibited; the means of facilitating the operation; the time of exhibiting the medicine; the temperature in which the patient is kept, after its operation is finished. The different individuals belonging to the class of emetics are chiefly contra-indicated by the presence of the following morbid states: A rupture or relaxation of containing membranes. Topical inflammation of the internal viscera. A high degree of morbid debility in these. Fixed obstructions to the circulation.

II. *Of Expectorants.*

The direct effects of the medicines which are employed under this name are as follows. They stimulate the lungs themselves. They augment the secretion taking place by the mucous glands of the lungs. They increase the excretion of mucus from the lungs. The changes induced in the system, from the primary effects of expectorants, are: an alteration on the state of the mucus excreted to a more thin and fluid consistence: an increase of the sensibility of the lungs: free circulation through the blood-vessels of the secreting glands: and the evacuation of those cavities in the lungs in which mucus is deposited.

Expectorants may be divided into the nauseating, as squills, gum ammoniac, and garlic; the antispasmodic, as blisters, feet, and vapour-baths; and irritative, as acid vapours, and the common smoking of tobacco. The indications these medicines are capable of fulfilling may be traced as follows: 1. From their affecting the secretion of mucus: whence they may be used to promote the secretion of mucus by the lungs, when morbidly diminished there. To render the mucus of the lungs thinner, when morbidly thick and viscid. 2. From their affecting the excretion of mucus: whence they may be employed to evacuate morbid accumulations of mucus in the lungs. To supply irritation to the lungs when morbidly deficient. 3. From their affecting the state of the lungs themselves: whence they may be employed as local stimulants.

The cautions to be observed in the employment of expectorants, as derived from their nature, chiefly respect: their operations as exciting nausea: their power of stimulating the system in general from acting on the stomach: and their influence as irritating the lungs themselves. The conditions of the system which chiefly require attention in their employment are: the degree of irritability with which the lungs are endowed: and the youth of the patient. The circumstances chiefly to be attended to in the regimen necessary for this class, are: the state of the stomach: the employment of diet fitted to conspire with the effect of the medicine: the free use of exercise: and the state of the atmosphere in which the patient breathes.

The different individuals belonging to the class of expectorants are chiefly contra-indicated by the presence of the following morbid states: a high degree of increased sensibility in the lungs: and an uncommonly quick excretion of mucus from the lungs.

III. *Of Diaphoretics.*

These are medicines which, taken internally, increase the discharge by the skin, without exciting this effect in consequence of violent agitation or acute pain. The following are their direct results: they accelerate the motion of the blood: produce free circulation through the vessels on the surface: and excite a discharge of sweat. The changes induced in the system, from the more immediate effects of diaphoretics, are: a change in the balance of the circulation: a diminution of the quantity of circulating fluids: and a diminution more particularly of the serosity.

Diaphoretics may be regarded as pungent, of which we have instances in spirit of hartshorn, oil of lavender, or amber; stimulant, as various preparations of antimony and quicksilver, guiacum, contrayerva, and snake-root; antispasmodic, as musk, opium, and camphor; and diluent, as water, and whey. Their use and indication may be collected, 1. From their changing the mode of circulation: whence they may be employed to obviate morbid determination taking place to the internal viscera. To remove various causes obstructing or impeding the natural state of circulation on the surface. To restore the natural discharge from the body, which should take place by the surface, in those cases where it is morbidly diminished. 2. From their producing evacuation: whence they may be employed to diminish the quantity of circulating fluids, where it is greater than the state of the system at the time can admit of. To restore diminished lymphatic absorption; and to discharge

morbid accumulations of serum. These indications may be illustrated and confirmed, from practical observations concerning the effects of diaphoretic medicines in fever, dysentery, rheumatism, dropsy, and herpes.

The cautions to be observed in the employment of diaphoretic medicines, as derived from their nature, chiefly respect: the determination they produce to the surface: the acceleration of the motion of the blood, which many of them occasion: the debility which, in consequence of the discharge, is produced in the system: and the effects sometimes produced on the vessels of the surface themselves, by the free passage of the blood through them. The conditions of the system which chiefly require attention in their employment, are: the period of infancy: lax and debilitated habits: constitutions liable to costiveness.

IV. *Of Diuretics.*

These are medicines which, from being taken internally, augment the flow of urine from the kidneys, by stimulating its secretion from the mass of circulating fluids. The changes induced in the system from these direct effects are: a change in the balance of circulation: a diminution of the quantity of circulating fluids; but more especially of the serosity and of the saline parts of the blood: an increase of absorption by the lymphatic vessels: a diminution of the quantity of matter discharged by perspiration: and an uncommon flow of fluid through the urinary passages.

Diuretics may be divided into such as are stimulant, of which we have instances in squills, broom, colchicum, cantharides: refrigerant, as sorrel, berberry, vinegar, cream of tartar; and diluent, as water, whey, and acidulated waters. Their use and indication may be ascertained from the following effects: 1. Their producing evacuation: whence they may be employed to remove superabundant serosity from the blood: to evacuate morbid accumulations of serum: to remove morbid acrimony from the blood: to diminish the quantity of circulating fluids, when too great for the state of the system at the time. 2. From their altering the mode of circulation: whence they may be employed to restore the natural secretion of urine when morbidly diminished: to diminish other secretions when morbidly augmented. 3. From their augmenting the flow of liquid through the urinary passages: whence they may be employed to remove obstructions in these passages, and to wash out acrimony from them. These indications may be illustrated by an attention to the effects of this class of medicines, as employed in ascites, icterus, and nephritis.

V. *Of Cathartics.*

These are medicines which, taken internally, increase the number of stools by stimulating the alimentary canal, increasing the peristaltic motion of the intestines, and promoting the secretion of the fluids, which constitute alvine evacuations. They may be subdivided into the following tribes: stimulant, as jalap, aloes, bitter-apple; refrigerant, as Glauber's salts, sal polychrest, cream of tartar: astringent, as rhubarb, rose-leaves; and emollient, as manna, mallows, castor-oil.

The changes induced in the system from the primary effects of cathartics, are: the evacuation of the contents of the intestines: a diminution of the quantity of circulating fluids, and, in a particular manner, of the serosity: a change in the balance of circulation: a diminution of perspiration: higher excitement of the nervous energy in the system in general, but more especially in the intestinal canal.

The indications which cathartic medicines are capable of fulfilling may be derived from the three following sources: 1. From their producing evacuation: whence they may be employed to obviate morbid retention of the contents of the intestines. To diminish the quantity of circulating fluids when too great for the then state of the system. To evacuate morbid accumulations of serum. 2. From their altering the balance of circulation: whence they may be employed to promote free circulation through the intestines, in those cases where it is morbidly impeded: to diminish the impetus of the blood against parts morbidly affected. 3. From the affection of the nervous system which they occasion: whence they may be employed to remove torpor in the muscular fibres of the intestines. To restrain inordinate motions in these muscular fibres. These indications may be illustrated and confirmed, from considering the effects of this class of medicines as employed in dysentery, small-pox, dropsy, obstructed menstruation, and diarrhœa.

The cautions to be observed in the employment of cathartics, as derived from their nature, chiefly respect, the degree of evacuation they produce from the circulating fluids; and the topical irritation they occasion to the intestines themselves. The conditions of the system which chiefly require attention in their employment, are childhood; female habits; hysterical constitutions; high degrees both of irritability and torpor; remarkable delicacy of the stomach; and peculiar antipathies. The circumstances chiefly to be regarded with respect to the regimen necessary for this class, are: the mode of exhibiting the cathartic: the time at which it is given: the temperature in which the patient is kept during its operation: the diet employed: and the degree of exercise he uses.

The morbid conditions, contra-indicating the use of cathartic medicines, apply only to particular orders. The stimulant, refrigerant, and astringent, are contra-indicated by general inanition of the system; the stimulant, by a high degree of irritability in the intestines, and by morbidly accelerated circulation; the refrigerant, by a circulation unusually slow and languid; the astringent, by habitual costiveness; and the emollient, by uncommon relaxation of the bowels.

VI. *Of Emmenagogues.*

By emmenagogues are meant medicines which possess a power of promoting that periodical secretion from the uterus, which should take place in certain conditions of the female frame. The following, therefore, are their effects: They stimulate the whole circulating system. They stimulate, in a particular manner, the vessels in the neighbourhood of the uterus; and this effect seems, in some degree, to be communicated to the vessels of the uterus themselves. They occasion a particular affection of the whole nervous system. The changes induced in the system from the primary effects of emmenagogues, are: an increase in the impetus of the blood circulating through the uterus and its neighbourhood: and an augmentation of the quantity of blood determined to the uterus. From some individuals referred to this class, there arises an increase of the tonic powers of the vessels in the uterus, and from others a diminution of it.

Emmenagogues may be divided into the following tribes: stimulant, as various forms of quicksilver and antimony: irritant, as aloes, savin, cantharides; tonic, as iron, cold-bath, corporeal exercise: and antispasmodic, as assafetida, castor, warm foot-bath.

Their indications may be thus traced: 1. From their changing the mode of circulation: whence they may be employed to free the circulatory system in the neighbourhood of the uterus when obstructed there: to promote that accumulation of fluid in the vessels of the uterus themselves, which is necessary to the menstrual discharge. To remove morbid obstructions to the passage of blood into the cavity of the uterus. 2. From their acting on the state of the animated solids: whence they may be used to increase the tonic power of the system where it is morbidly diminished. To increase the tonic power in the vessels of the uterus in particular, when deficient there. To remove spasmodic stricture taking place on the vessels of the uterus.

Practical observation in different cases of obstructed menstruation, arising from different causes, will illustrate and confirm these various indications.

The cautions to be observed in the employment of emmenagogues chiefly respect the consequences of a cure, if urged too precipitately or violently: the irritation produced to the intestines; and the stimulus affecting the whole system. The conditions of the animal frame which require attention in their employment, are: the age of the patient: the complaints to which she has formerly been liable: the duration of her present complaints: and her general character. The circumstances chiefly to be attended to in the regimen necessary, respect: the temperature in which the patient is kept: the use of moderate exercise: and the employment of liberal diet.

In enumerating the morbid conditions contra-indicating emmenagogues, a distinction is to be made betwixt those which contra-indicate the restoration of the discharge altogether, and those which contra-indicate particular modes of restoring it. As morbid conditions, which entirely contra-indicate the restoration of this discharge, we may mention extreme debility, either constitutional, or induced by previous disease, which prohibit our attempting its restoration so long as the debility continues: the time of critical discharges: high degrees of irritability and torpor: and a constitutional disposition to *deliquium animi*. The circumstances chiefly to be attended to in the regimen necessary respect: the adapting the diet and temperature to the disease under which the patient labours: the time of performing the operation: the state of the ingesta at that time: and the mode of the discharge.

VII. *Of Errhines.*

These are medicines which, when topically applied to the internal membrane of the nose, excite sneezing, and increase the secretion without any mechanical irritation. They may be regarded as of two kinds, sternutatory, or those used for the purpose of general agitation chiefly, as tobacco, snuff, hellebore, euphorbium; and evacuant, or those designed to produce determination of the fluids to the nostrils, as asarum, beta, betonica.

The changes induced in the system, from the primary effects of errhines, are: violent agitation of the body: commotion of the nervous system: sudden changes in the circulation: a diminution of the quantity of circulating fluids: more free circulation through the mucous glands, on which the errhine acts: a change in the balance of circulation subsisting betwixt these and the neighbouring parts.

The use of errhines may hence be ascertained by the following results: 1. From their producing agitation of the system in general: whence they may be employed to discharge morbid accumulations of mucus in the cavities surrounding the nose. To remove a state of torpor in the nervous system. To obviate nervous affections of the convulsive or spasmodic kind. 2. From their producing determination to the nose: whence they may be employed to promote the secretion of mucus in the nose when morbidly diminished. To occasion derivation from parts morbidly affected in the neighbourhood of the nose. These indications may be illustrated and confirmed from practical observations concerning the effects of this class of medicines, when employed in cases of apoplexy, palsy, head-ach, and ophthalmies.

The cautions to be observed in the employment of errhines, as derived from their nature, respect chiefly: the agitation they produce in the system in general: and the change they occasion in determination, whether as producing a greater flow to the nose, or derivation from other parts. The conditions of the system chiefly requiring attention in the employment, are; infancy: old age: irritable and hæmorrhagic habits: those which are morbidly torpid: and those formerly accustomed to the frequent use of the same stimulus. The circumstances to be attended to in the regimen necessary, respect: the means of obviating inflammation when excited: and the avoiding sudden exposure to cold air.

The different individuals belonging to the class of errhines, are chiefly contra-indicated by the presence of the following morbid states: a high degree of plethora: morbid debility of the viscera: uncommon sensibility of the nose: preternatural determination to the nose: and ulceration of the nose or of neighbouring parts.

VIII. *Of Sialagogues.*

Sialagogues are medicines which excite an uncommon flow of saliva. They stimulate the salivary glands, or their excretories. They increase the action of the vessels secreting saliva. They accelerate the circulation through the salivary glands, and through the blood-vessels in the neighbourhood of these. They produce a præternatural discharge of saliva, both in point of quantity and consistence. The changes induced in the system, from the primary effects of sialagogues, are: a change in the distribution of the fluids circulating through these vessels to which the action of the sialagogue extends, and through the vessels in the neighbourhood of these: a diminution of the quantity of circulating fluids in general: and a change in the state of the remaining mass, independently of the diminution of quantity. They may be distributed into topical, as squills, tobacco, peppers, and other aromatics; and general, as mercurial preparations.

The use of sialogogues may be determined as follows: 1. From their effects as changing the balance of circulation: whence they may be employed to diminish the impetus of the blood against parts morbidly affected in the neighbourhood of the salivary glands. To diminish the action of the vessels when morbidly increased in these neighbouring parts. To promote free circulation of the

blood through the salivary glands, when morbidly obstructed there. 2. From their effects, as producing evacuation: whence they may be employed to evacuate morbid accumulations of serum. To produce a thorough change in the fluids of the body, when morbidly vitiated.

These uses may be illustrated from practical observations in cases of tooth-ach, angina, dropsy, and siphilis.

The cautions to be observed in the employment of sialagogues, as derived from their nature, respect chiefly: the stimulus they occasion to the salivary glands and other neighbouring parts: the time required by the order of interna for the production of evacuation: the difficulty, perhaps, in some cases, the impossibility, of exciting salivation by means of the interna: and the debility induced in the system from excessive evacuation. The conditions of the system chiefly requiring attention in their employment, are: old age: constitutions habituated to sialagogues: peculiarities in constitution, determining the mercury to act on other parts than the salivary glands: menstruation; and pregnancy. Sialagogues are contraindicated where there is an uncommon determination to the salivary glands; preternatural sensibility in them; deficient serosity; and general debility of the system.

IX. *Of Emollients.*

By emollients are meant medicines which have a power of relaxing the living animal fibre, independently of mechanical action. They render the part to which they are immediately applied more soft and flexible than it was before. They excite a peculiar sensation indistinctly referred to the part to which they are applied. They produce, through the rest of the system, an effect in some degree analogous to that taking place in the part on which they more immediately act. The changes induced in the system from the primary effects of emollients are: a diminution of the power of cohesion in various parts of the animal body: a diminution of tonic power in the system: an increase of the capacity of containing vessels in the part on which they more particularly act, and in some degree in the system in general; and an increase of irritability and sensibility through the entire frame.

They may be regarded as humectant, of which we have examples in warm water, warm vapour, and warm baths: laxative, as marshmallows, mallows, white lily root; lubricative, as bland oils, suet, hogs-lard: atonic, as opium, foot-bath.

The curative indications of emollients may be collected hence. 1. From their producing a change in the state of the moving solids. Hence they may be employed to restore the natural flexibility to parts morbidly rigid. To diminish a morbid increase of tonic power. 2. From their producing a change in the state of the containing vessels. Hence they may be employed to obviate the effects of morbid distention. To remove obstructions. These indications may be illustrated and confirmed from practical observations concerning the effects of this class of medicines, as employed in cases of contraction, rigidity, and tumor. The cautions to be observed in the employment of emollients, as derived from their nature, chiefly respect: their influence as acting on the system in general: and the effects of a degree of laxity induced in particular parts, higher than is natural to these. The conditions of the system which chiefly require attention in their employment are: the period of youth: delicacy of habit and debility. The circumstances chiefly to be attended to in the necessary regimen, respect: the temperature and air in which the patient is kept: and the mode of applying the emollient. The class of emollients are chiefly contra-indicated by the presence of the following morbid states: a high degree of morbid relaxation in the system in general: and a peculiar sensibility of the moving fibres.

X. *Of Refrigerants.*

These are medicines which, as their name implies, are supposed to diminish the heat of the living body, not by the application of an actual cold, but by a power peculiar to themselves.

They may be considered under the two divisions of acids, or acetous fruits, as tamarinds, berberries, lemons, wood-sorrel; and neutral salts, as nitre, Glauber's salt, sal polychrest. They may hence be usefully employed in cases of febrile heat, or of general plethora; and are a useful auxiliary to the tribe of refrigerant cathartics. 2. As sedatives, to diminish undue irritability and action of any of the vascular systems: and are hence usefully conjoined with the sedatives, more properly so called, of Class XV. of this system. In the employment of these medicines, attention should be paid to their power of diminishing action, and either generally checking the secretions of the system, or augmenting some by a diminution of others. Hence they are contra-indicated in cases of chlorosis, leucophlegmatic habits, and predispositions to dropsical affections. We enlarge the less, however, upon this subject, because the indications and contra-indications are closely connected, as we have just observed, with the articles and the remarks offered upon Class XV. of which, in various systems of therapeutics, they merely constitute a separate division.

XI. *Of Astringents.*

These are medicines which possess a power of condensing the animal fibre, without the aid of mechanical action. In general they are found to excite a peculiar sensation referred to the part to which they are applied; if to the organs of taste, a sense of dryness. They produce a remarkable corrugation in the parts on which they more immediately act. They occasion, in some degree, a similar affection through the rest of the system. Some individuals belonging to this class produce an evident condensation in dead animal fibres. The changes induced in the system from the primary effects of astringents, are: an increase of the power of cohesion in various parts of the animal body: an increase of what may be termed the tonic power in the system: a diminution of the capacity of containing vessels in the system: a diminution of irritability, and perhaps, in some degree, of sensibility.

Astringents may be divided into styptic, of which we have examples in most metallic oxyds, as well as in aluminous earths: corrugant, as rose-leaves, galls, oak-bark; indurant, as alcohol and acids; and tonic, as exercise, cold, and friction. The indications of cure which the class of astringent medicines are capable of fulfilling may be deduced from the following sources. 1. From the alteration they produce on the state of the moving solids: whence they may be employed to obviate original delicacy. To restore natural compactness to parts morbidly relaxed. To restore diminished tonic power. To diminish mobility when

morbidly increased. 2. From the alteration they produce on the state of the containing vessels: whence they may be employed to diminish secretions morbidly augmented. To increase the power of retaining excrementitious matters when morbidly diminished. To produce a constriction on the orifices of ruptured vessels.

These indications may be illustrated and confirmed from practical observations concerning the effects of astringents in cases of hysteria, epilepsy, hæmorrhage, and diarrhœa.

The cautions to be observed in the employment of astringents, as derived from their nature, chiefly respect the stimulant and caustic powers possessed by many individuals belonging to the class: the effects of an alteration produced in the solids if carried beyond the natural state: and, in a particular manner, their influence as diminishing secretions; and as increasing the power of the system for the retention of excrementitious matters. The conditions of the system which chiefly require attention in their employment are, old age, melancholic habits, and particular morbid affections of the stomach. The circumstances chiefly to be attended to in the regimen necessary, respect: the avoiding a relaxing diet: and the keeping the patient in cool temperature and dry air.

Astringents are chiefly contra-indicated by the presence of the following morbid states: a high degree of rigidity in the system in general: remarkable insensibility in the moving fibres: and particular diminution of the excretions from the body.

XII. *Of Tonics.*

The medicines thus denominated are those which increase the tone of the muscular fibre, are supposed to brace the system when constitutionally relaxed, and give it vigour when debilitated by immediate disease. They may be divided into stimulants, as various preparations of mercury, iron, zinc, and other metals; and astringents, as chamomile-flowers, myrrh, Peruvian and other barks, and gentian. It is hence obvious that this class of medicines has a near relation to those noticed in the class that immediately precedes and immediately follows it. On which account we shall dismiss it with a single additional observation or two. The changes induced in the system by the use of tonics are, increase of muscular power, greater moderation, and a firmer stroke of the pulse, increased desire for food, and an augmented vivacity of the animal spirits. Hence their use is clearly indicated in all cases in which there is a deficiency of these natural powers or desires. They are, therefore, contra-indicated by the existence of a plethoric habit, constitutional predisposition to maniacal affections, or topical hæmorrhages; and a sanguineous temperament.

XIII. *Of Stimulants.*

These, like the last, are medicines which have a power of exciting the animal energy; but for the most part topically, rather than generally, or for a shorter period of time. They occasion a particular sensation referred to the part more immediately acted upon; frequently a sense of pain. They increase the action of muscular fibres in that part, particularly in its vessels. They increase the energy of the sensorium. They increase the nervous energy in the moving fibres through the system in general. The changes induced in the system from the primary effects of stimulants are: acceleration of the motion of the blood in the part to which they are particularly applied: an increase of the force of circulation in the system in general: an increase of excitement in the powers of sensation: and an augmentation of mobility and vigour in the muscular organs. They may be divided into the following heads: topical, of which we have examples in mustard-seed, cantharides, mercurial preparations: diffusible, of which we have instances in volatile alkali, electricity, heat: cardiac, such as cinnamon, nutmegs, and other spices, and wine. The indications of cure which stimulants are capable of fulfilling may be derived from the three following sources. 1. From their affecting the state of circulation: whence they may be employed to facilitate the passage of blood through parts in which it is morbidly obstructed. To augment the force and celerity of the circulation where it is morbidly slow and weak. 2. From their acting on the powers of sensation: whence they may be employed to quicken the senses where morbidly dull. To rouse the mental faculties when in a lethargic state. To exhilarate a despondent condition. 3. From their acting on the moving fibres: whence they may be employed to restore the power of motion where morbidly deficient. To increase the strength of motion when morbidly weak. These indications may be illustrated and confirmed from practical observations concerning the effects of this class of medicines, as employed in cases of syncope, apoplexy, and palsy. The cautions to be observed in employing stimulants, are the pain they excite; the violence of circulation; or the flow of the animal spirits which they produce; the mobility of the system which arises from their employment; and the collapse, which is the consequence of high and sudden excitement. The conditions of the system which chiefly require attention in their employment are delicate and irritable habits. The circumstances chiefly to be attended to in the regimen necessary, respect the diet and temperature best adapted to the stimulant employed; and the nature of the particular disease in which it is used. The individuals belonging to this class are chiefly contra-indicated by the presence of the following morbid states: a high degree of morbid irritability; the circulation uncommonly accelerated; and a præternatural disposition to hæmorrhage.

XIV. *Of Antispasmodics.*

By these are meant whatever has a power of allaying inordinate motions in the system, particularly those involuntary contractions which take place in muscles naturally subject to the command of the will; they counteract and remove various causes exciting contractions; they diminish the influence of the nervous energy in the parts spasmodically affected. The changes induced in the system, from the primary effects of antispasmodics, are the restoration of the proper balance of the nervous energy in different parts of the body; the restoration of the due influence of the will; and the restoration of the natural state of tension to the muscles. The different articles referred to the class of antispasmodics may be distributed into the two following orders: stimulant, as volatile alkali, essential oils, ether; sedative, as camphor, musk, opium. As the action of the medicines referred to this class depends entirely upon the presence of a morbid state, what has been advanced with regard to their nature will, in a good measure, serve to illustrate their use. The indications of cure, which, as antispasmodics, they are capable of fulfilling, are entirely to be derived from their

influence on the nervous energy. Hence they may be used to remove spasmodic contractions taking place in different muscles. To allay convulsive agitations. These indications may be illustrated and confirmed from practical observations concerning the effects of antispasmodics, as employed in cases of epilepsy and cramp. The circumstances claiming attention in the employment of antispasmodics, which respect either the nature of the medicine itself, the condition of the patient in whom it is used, or the necessary regimen, are different according to the particular order which is employed. They will easily be understood from what has already been said of stimulants and sedatives considered as separate classes.

There is, perhaps, no condition of the body which will contra-indicate the use of every individual referred to the class of antispasmodics. But the same morbid conditions, which have already been mentioned, as contra-indicating the use of stimulants and sedatives, will likewise contra-indicate the orders of antispasmodics denominated from these classes.

XV. *Of Narcotics.*

These are medicines which have a power of diminishing the animal energy, and hence inducing torpor and sleep, during which this energy is usually recruited and restored. They diminish the sensibility of the part to which they are particularly applied. They diminish the action and tonic power of its muscular fibres. They produce a peculiar sensation in the system in general. They diminish the energy of the sensorium.

The changes induced in the system, from the primary effects of narcotics, are: retardation of the blood's motion in the part more immediately acted upon: diminution of the force of circulation in the system in general: diminution of excitement in the powers of sensation and reflection: and diminution of vigour in muscular action through the system.

Narcotics may be divided into those which act directly and those which act indirectly: of the former tribe are poppies, opium, hyoscyamus, hops, and lettuce: of the latter neutral salts and acids. Their use may be calculated from the following sources: 1. From their affecting the circulation: whence they may be employed to diminish the force and celerity of the blood's motion where morbidly augmented. To diminish the impetus of the blood against parts morbidly affected. 2. From their acting on the powers of sensation: whence they may be employed to abate violent pain. To procure sleep in cases of præternatural watchfulness. 3. And from their acting on the moving fibres: whence thay may be employed to restrain inordinate motions, and to moderate excessive evacuations. These indications may be illustrated and confirmed from practical observations concerning the effects of this class of medicines, as employed in cases of inflammation, tooth-ach, and dysentery. The cautions to be observed in the employment of this class of medicines, as derived from their nature, chiefly respect: the insensibility which they produce: the atonia they occasion in the muscular fibres, particularly in the blood-vessels: and the suspension of the powers of sensation with which they are sometimes followed.—The conditions of the system which chiefly require attention in their employment are: irritable and relaxed habits: and those who are constitutionally liable to delirium from their use.—The circumstances chiefly to be attended to in the necessary regimen respect: the regulation of the dose of the medicine employed: the avoiding all stimulating causes during their operation: and the guarding against their becoming habitual to the system. Narcotics are chiefly contra-indicated by a præternaturally languid circulation; a peculiarly lethargic disposition, and great morbid torpor in the system.

XVI. *Of Anthelmintics.*

By anthelmintics are meant those medicines which, without endangering the life of the patient, are effectual in procuring the removal of worms lodged in the human body. The direct effects arising from this class of medicines are intended to be exerted only on the worms themselves; but there are, at the same time, few, if any medicines, which, when employed with this intention, do not also produce some effect on the animal body: to enter upon the consideration of these, however, would be foreign to this class. As anthelmintics, they produce the following effects: they kill worms to which they come to be applied in the body: they expel them from the body: they prevent their generation in the body. The only changes produced in the system that are here to be considered, are those which arise from their action upon the worms themselves. These are the removal of an almost infinite variety of different symptoms which worms produce whilst lodged in the body. Anthelmintics may be subdivided into the following tribes: poisonous, as quicksilver, tin, sulphur: lubricant, as oil of olives and oil of linseed; tonic, as savin tansy, santonicum: cathartic, as scammony, jalap, aloes, gamboge. Their indications are manifested from the following considerations: 1. From their action on the worms themselves: whence they may be employed to kill worms lodged in different parts of the human body: 2. From their action on the system: whence they may be used to promote the expulsion of worms from the body, whether dead or alive. To prevent the generation of worms in the body. These indications may be illustrated and confirmed from practical observations concerning the use of anthelmintics in cases of atrophia, diarrhœa, and vomitus.

The cautions to be observed in the employment of anthelmintics, as derived from their nature, chiefly respect the other effects they will have upon the system, independent of their action as anthelmintics.—The conditions of the system which chiefly require attention in their employment are infancy, delicacy of habit, and other similar affections. In the regimen, farinaceous food should be avoided; and exercise should be encouraged.

There are, perhaps, no morbid conditions of the system, during which the removal of worms from the body may not, with propriety, be attempted by one means or other. But, although it may be doubtful whether there are morbid conditions contra-indicating the whole class; yet it cannot be questioned that there are many contra-indicating particular orders. Among others may be mentioned, an abraded or inflamed state of the intestines contra-indicating the poisonous; accumulations of feces in the first passages contra-indicating the lubricant; a peculiar sensibility of the stomach contra-indicating the tonic; and topical inflammation of the intestines, previous looseness, or a high degree of inanition contra-indicating the cathartic.

XVII. *Absorbents.*

This term is used differently by different therapeutists. Generally speaking, it implies medicines which, possessing no acrimony in themselves, possess, notwithstanding, a power of destroying acidities in the stomach and bowels: at other times, however, it is employed more largely to indicate those substances as well which increase the general action of the absorbent system. They may hence be divided into two kinds, the calcareous, as burnt hartshorn, oyster-shells, and chalk; and stimulative, as burnt sponge, salt of hartshorn, and alkalis. They are hence indicated in peculiar acrimonies or peculiar torpidities of the system generally, or particular organs of the system: and may hence be employed beneficially in acidities of the stomach, heart-burn, and excesses in vinous potation: as well as in strumous and other leucophlegmatic affections of the glandular system, especially in bronchocele, or the disease termed, provincially, Derbyshire-neck, and scirrhosities of either extremity of the stomach. Their use may be collected from practical attention to these diseases, in which, notwithstanding, they commonly require to be connected with more active applications. On this last account they may generally be employed without apprehension: yet in cases of acidity of the stomach, they have often been used to an extent that has produced worse diseases than the malady they were intended to remedy, and have laid the foundation for calcareous concretions that have resisted the application of almost every purgative, and formed indurations almost as troublesome as the calcareous concretions of the bladder: concretions which have only been removed by a long use of active lithontriptics.

MATE'RIAL. *a.* (*materiel*, French.) 1. Consisting of matter; corporeal; not spiritual (*Davies*). 2. Important; momentous; essential (*Whit.*). 3. Not formal: as, though the *material* action was the same, it was formally different.

MATE'RIALIST. *s.* (from *material.*) One who denies spiritual substances (*Dryden*).

MATERIALISTS, a sect in the ancient church, composed of persons who, being prepossessed with that maxim in the ancient philosophy, *Ex nihilo nihil fit*, "Out of nothing nothing can arise," had recourse to an internal matter, on which they supposed God wrought in the creation; instead of admitting God alone as the sole cause of the existence of all things. Tertullian vigorously opposes the doctrine of the materialists, in his treatise against Hermogenes, who was one of their number.

Materialists is also a name given to those who maintain that the soul of man is material; or that the principle of perception and thought is not a substance distinct from the body, but the result of corporeal organization. There are others, called by this name, who have maintained that there is nothing but matter in the universe; and that the Deity himself is material. See SPINOSISM.

MATERIA'LITY. *s.* (*materialité*, Fr.). Corporeity; material existence; not spirituality (*Boyle*).

MATE'RIALLY. *ad.* (from *material.*) 1. In the state of matter (*Boyle*). 2. Not formally (*South*). 3. Importantly; essentially (*Spenser*).

MATE'RIALNESS. *s.* (from *material.*) State of being material.

MATE'RIALS. *s.* (*materiaux*, French.) The substance of which any thing is made (*Brown*).

MATE'RIATE. MATE'RIATED. *a.* (*materiatus*, Latin.) Consisting of matter.

MATERIA'TION. *s.* (from *materia*, Lat.) The act of forming matter (*Brown*).

MATE'RNAL. *a.* (*maternus*, Latin.) Motherly; befitting or pertaining to a mother (*Dryden*).

MATE'RNITY. *s.* (from *maturnus*, Lat.) The character or relation of a mother.

MATHEMA'TICAL. MATHEMA'TIC. *a.* (*mathematicus*, Latin.) Considered according to the doctrine of the mathematicians (*Denham*).

MATHEMA'TICALLY. *ad.* According to the laws of the mathematical sciences (*Bentley*).

MATHEMATI'CIAN. *s.* (*mathematicus*, Latin.) A man versed in the mathematics (*Addison*).

MATHEMATICS, the science that considers magnitudes either as computable or measurable. The word in its original, μαθησις, signifies discipline, or science in the general; and seems to have been applied to the doctrine of quantity, either by way of eminence, or because, this having the start of all other sciences, the rest took their common name therefrom. See SCIENCE.

For the origin of mathematics, Josephus dates it before the flood, and makes the sons of Seth observers of the course and order of the heavenly bodies: he adds, that, to perpetuate their discoveries, and secure them from the injuries either of a deluge or a conflagration, they had them engraven on two pillars, the one of stone, the other of brick; the former of which he says was standing in Syria in his days.

The first who cultivated mathematics after the flood were the Assyrians and Chaldeans; from whom, the same Josephus adds, they were carried by Abraham to the Egyptians; who proved such notable proficients, that Aristotle makes no scruple to fix the first rise of mathematics among them. From Egypt, 584 years before Christ, they passed into Greece through the hands of Thales; who having learned geometry of the Egyptian priests, taught it in his own country. After Thales, comes Pythagoras; who, among other mathematical arts, paid a particular regard to arithmetic; fetching the greatest part of his philosophy from numbers: he was the first, as Laertius tells us, who abstracted geometry from matter; and to him we owe the doctrine of incommensurable magnitude, and the five regular bodies, besides the first principles of music and astronomy. Pythagoras was seconded by Anaxagoras, Œnopides, Briso, Antipho, and Hippocrates of Scio; who all applied themselves particularly to the quadrature of the circle, the duplicature of the cube, &c. but the last with most success: this

last is also mentioned by Proclus, as the first who compiled elements of mathematics.

Democritus excelled in mathematics as well as physics; though none of his works in either kind are extant, the destruction of which some authors ascribe to Aristotle. The next in order is Plato, who not only improved geometry, but introduced it into physics, and so laid the foundation of solid philosophy. Out of his school proceeded a crowd of mathematicians. Proclus mentions 13 of note; among whom was Leodamus, who improved the analysis first invented by Plato; Theætetus, who wrote elements; and Archiates, who has the credit of being the first who applied mathematics to use in life. These were succeeded by Neocles and Theon, the last of whom contributed to the elements. Eudoxus excelled in arithmetic and geometry, and was the first founder of a system of astronomy. Manechmus invented the conic sections, and Theudius and Hermotimus improved the elements.

As for Aristotle, his works are so stored with mathematics, that Blancanus compiled a whole book of them: out of his school came Eudemus and Theophrastus; the first of whom wrote of numbers, geometry, and invisible lines; the latter, a mathematical history. To Aristeus, Isidorus, and Hypsicles, we owe the books of solids; which, with the other books of elements, were improved, collected, and methodised by Euclid, who died 284 years before Christ.

An hundred years after Euclid, came Eratosthenes and Archimedes. Cotemporary with the latter was Conon, a geometrician and astronomer. Soon after came Apollonius Pergæus; whose conics are still extant. To him are likewise ascribed the 14th and 15th books of Euclid, which are said to have been contracted by Hypsicles. Hipparchus and Menelaus wrote on the subtenses in a circle, the latter also on spherical triangles: Theodosius's three books of spherics are still extant. And all these, Menelaus excepted, lived before Christ.

A. D. 70. Ptolemy of Alexandria was born; the prince of astronomers, and no mean geometrician: he was succeeded by the philosopher Plutarch, of whom we have still extant some mathematical problems. After him came Eutocius, who commented on Archimedes, and occasionally mentions the inventions of Philo, Diocles, Nicomedes, Sporus, and Heron, on the duplicature of the cube. To Ctesebes of Alexandria we are indebted for pumps; and Geminus, who lived soon after, is preferred by Proclus to Euclid himself.

Diophantus of Alexandria was a great master of numbers, and the first Greek writer on algebra. Among others of the ancients, Nicomachus is celebrated for his arithmetical, geometrical, and musical works: Serenus, for his books on the section of the cylinder; Proclus, for his commentaries on Euclid; and Theon has the credit among some of being author of the books of elements ascribed to Euclid. The last to be named among the ancients is Pappus of Alexandria, who flourished about the year of Christ 400, and is justly celebrated for his books of mathematical collections, still extant.

Mathematics are commonly distinguished into speculative and practical, pure and mixed.

Speculative mathematics, is that which barely contemplates the properties of things: and

Practical mathematics, that which applies the knowledge of those properties to some uses in life.

Pure mathematics is that branch which considers quantity abstractedly, and without any relation to matter or bodies.

Mixed mathematics considers quantity as subsisting in material being; for instance, length in a pole, depth in a river, height in a tower, &c.

Pure mathematics, again, either considers quantity as discrete, and so computable, as arithmetic; or as concrete, and so measureable, as geometry.

Mixed mathematics are very extensive, and are distinguished by various names, according to the different subjects it considers, and the different views in which it is taken; such as astronomy, geography, optics, hydrostatics, navigation, &c. &c.

Pure mathematics has one peculiar advantage, that it occasions no contests among wrangling disputants, as happens in other branches of knowledge: and the reason is, because the definitions of the terms are premised, and every person that reads a proposition has the same idea of every part of it. Hence it is easy to put an end to all mathematical controversies, by shewing, either that our adversary has not kept to his definitions, or has not laid down true premises, or else that he has drawn false conclusions from true principles; and in case we are not able to do either of these, we must acknowledge the truth of what he has proved.

It is true, that in mixed mathematics, where we reason mathematically upon physical subjects, such just definitions cannot be given as in geometry: we must therefore be content with descriptions; which will be of the same use as definitions, provided we be consistent with ourselves, and always mean the same thing by those terms we have once explained.

Dr. Barrow gives a very elegant description of the excellence and usefulness of mathematical knowledge, in his inaugural oration, upon being appointed Professor of Mathematics at Cambridge. The mathematics, he observes, effectually exercise, not vainly delude, nor vexatiously torment studious minds with obscure subtilties, but plainly demonstrate every thing within their reach, draw certain conclusions, instruct by profitable rules, and unfold pleasant questions. These disciplines likewise enure and corroborate the mind to a constant diligence in study; they wholly deliver us from a credulous simplicity, most strongly fortify us against the vanity of scepticism, effectually re-

strain us from a rash presumption, most easily incline us to a due assent, and perfectly subject us to the government of right reason. While the mind is abstracted and elevated from sensible matter, distinctly views pure forms, conceives the beauty of ideas, and investigates the harmony of proportion; the manners themselves are sensibly corrected and improved, the affections composed and rectified, the fancy calmed and settled, and the understanding raised and excited to more divine contemplations.

For the history of mathematics consult Wallis, Montucla, Kaestner, Hutton, Bossut, Bailly, &c. See also the words ALGEBRA, ARITHMETIC, ASTRONOMY, DYNAMICS, FLUXIONS, GEOMETRY, &c. in this work.

MATHEMATICAL INSTRUMENTS, such instruments as are usually employed by mathematicians, as COMPASSES, SCALES, QUADRANTS, &c. See the respective words.

MATHER (Dr. Cotton), an eminent American divine, born at Boston in New England, in the year 1663. He was educated in Harward college, and in 1684 became minister of Boston; in the diligent discharge of which office he spent his life, and promoted several excellent societies for the public good: particularly one for suppressing disorders, one for reforming manners, and a society of peace-makers, whose professed business it was to compose differences and prevent law-suits. His reputation was not confined to his own country, for in 1710 the university of Glasgow sent him a diploma for the degree of doctor in divinity, and in 1714 the Royal Society of London chose him one of their fellows. He died in 1728; and is said to have published in his life-time 382 pieces, including single sermons, essays, &c. yet several were of a larger size, among which was Magnalia Christi Americana, or an Ecclesiastical History of New England, from its first planting in 1620 to 1698, folio. But the most remarkable of all his works was that in which, like Glanville, he defended the doctrine of witchcraft. We shall content ourselves with giving the title at large, which is as follows: "The Wonders of the Invisible World; being an account of the trials of several witches lately executed in New England, and of several remarkable curiosities therein occurring. Together with, 1. Observations on the nature, the number, and the operations of the devils. 2. A short narrative of a late outrage committed by a knot of witches in Swedeland; very much resembling and so far explaining that under which New England has laboured. 3. Some counsels directing a due improvement of the terrible things lately done by the unusual and amazing range of evil spirits in New England. 4. A brief discourse upon the temptations which are the more ordinary devices of Satan. By Cotton Mather: published by the special command of his excellency the governor of the province of Massachuset's Bay in New England." Printed first at Boston in New England, and reprinted at London in 1736, 4to.

MATHE'SIS. *s.* (μαθησις.) The doctrine of mathematics (*Pope*).

MA'TIN. *a.* (*matine*, French.) Morning; used in the morning (*Milton*).

MA'TIN. *s.* Morning (*Shakspeare*).

MA'TINS. *s.* (*matines*, French.) Morning worship (*Cleaveland, Stillingfleet*).

MATLOCK, a village in Derbyshire, situate on the Derwent, four miles N. of Wirksworth. It is an extensive straggling place, built in a romantic style, on the steep side of a mountain. A little to the S. is Matlock bath, famous for two warm baths, called the Old and New Bath, which are much frequented in the bathing season. There are good accommodations for the company who resort to the baths, and the poorer inhabitants are supported by the sale of petrifactions, crystals, &c. The cliffs of the rocks produce a great number of trees, whose foliage adds greatly to the beauty of the place.

MATLOCK WATER. A mineral water in the neighbourhood of the place whose name it bears. It is found to contain a small quantity of a neutral salt, probably muriat of soda, and about as much of an earthy salt, which is chiefly calcareous. No traces of iron are discoverable by any test, nor does there appear to be any excess of carbonic acid, as in the Bristol Hotwell. It may be employed in all those cases where a pure diluent drink is advisable; but it is principally used as a tepid bath, or at least one that comes to the extreme limits of a cold bath.

MATRASS, CUCURBIT, or BOLTHEAD, among chemists. See CHEMISTRY, CUCURBIT, and LABORATORY.

MATRICA'LIA. (from *matrix*, the womb.) Medicines employed in diseases of this organ.

MATRICA'RIA. Mother-wort. In botany, a genus of the class syngenesia, order polygamia superflua. Receptacle naked, cylindrico-conic; downless; calyx flattish, imbricate; the scales scarious at the margin. Three species: one of the Cape; two of Europe, of which last, M. chamomilla is common to our own wastes. This species is sometimes, but erroneously, named feverfew. The real feverfew is PYRETHMUM, which see.

The leaves of the M. suaveolens have a strong, not agreeable smell, and a moderately bitter taste, both which they communicate, by warm infusion, to water and rectified spirit. The watery infusions, inspissated, leave an extract of considerable bitterness, and which discovers also a saline matter, both to the taste, and in a more sensible manner by throwing up to the surface small crystalline efflorescences in keeping. The peculiar flavour of the matricaria exhales, in the evaporation, and impregnates the distilled water, on which also a quantity of essential oil is found floating. The quantity of spiritous extract, according to Cartheuser's experiments, is only about one-sixth the weight of the dry leaves, whereas the watery extract amounts to near one half. This plant is evi-

dently the parthenium of Dioscorides, since whose time it has been very generally employed for medical purposes. In natural affinity it ranks with camomile and tansy, and its sensible qualities shew it to be nearly allied to them in its medicinal character. Bergius states its virtues to be tonic, stomachic, resolvent, and emmenagogue. It has been given successfully as a vermifuge, and for the cure of intermittents; but its use is most celebrated in female disorders, especially in hysteria; and hence it is supposed to have derived the name matricaria. Its smell, taste, and analysis, prove it to be a medicine of considerable activity.

MATRICE, or MATRIX. See MATRIX.

MATRICE, or MATRIX, in dying, is applied to the five simple colours, whence all the rest are derived or composed. These are, the black, white, blue, red, and yellow or root colour. See DYING.

MATRICE, or MATRICES, used by the letter-founders, are those little pieces of copper or brass, at one end whereof are engraven, dent-wise, or *en creux*, the several characters used in the composing of books.

Each character, vergula, and even each point, in a discourse, has its several matrix; and, of consequence, its several puncheon to strike it. They are the engravers on metal, that cut, or grave, the matrices.

When types are to be cast, the matrice is fastened to the end of a mould, so disposed, as that when the metal is poured on it, it may fall into the creux, or cavity of the matrice, and take the figure and impression thereof.

MATRICES, used in coining, are pieces of steel, in form of dyes; whereon are engraven the several figures, arms, characters, legends, &c. wherewith the species are to be stamped.

MATRICIDE. *s.* (*matricidium*, Latin.) 1. Slaughter of a mother (*Brown*). 2. (*matricida*, Latin.) A mother killer (*Ainsworth*).

To MATRI'CULATE. *v. a.* (from *matriculo*, Latin.) To enter or admit to a membership of the universities of England; to enlist (*Walton*).

MATRI'CULATE. *s.* (from the verb.) A man matriculated (*Arbuthnot*).

MARTRICULA'TION. *s.* (from *matriculate*.) The act of matriculating (*Ayliffe*).

MATRIMO'NIAL. *a.* (*matrimonial*, Fr.) Suitable to marriage; pertaining to marriage; connubial; nuptial; hymeneal (*Dryden*).

MATRIMO'NIALLY. *ad.* According to the manner or laws of marriage (*Ayliffe*).

MA'TRIMONY. *s.* (*matrimonium*, Latin.) Marriage; the nuptial state; the contract of man and wife; nuptials. See MARRIAGE.

MATRIMONY, a game at cards, so called from the resemblance of its general course to the course of matrimony, as it is sometimes found in high life.

Matrimony may be played by any number of persons from five to fourteen. This game is composed of five chances, usually marked on a board or sheet of paper, as follows:

Best
The ace of Diamonds turned up.

Confederacy
King and Knave.

INTRIGUE,
OR
QUEEN AND KNAVE.

Matrimony
King and Queen.

Pairs
The Highest.

The ace of diamonds turned up takes the whole pool, but when in hand ranks only as any other ace, and if not turned up, nor any ace in hand, then the king, or next superior card, wins the chance styled best.

The game is generally played with counters, and the dealer stakes what he pleases on each or any chance, the other players depositing each the same quantity, except one; that is, when the dealer stakes twelve, the rest of the company lay down eleven each. After this, two cards are dealt round to every one, beginning on the left, then to each one another card turned up, and he who so happens to get the ace of diamonds sweeps all; if it is not turned up, then each player shews his hand, and any of them having matrimony, intrigue, &c. takes the counters on that point; and when two or more people happen to have a similar combination, the eldest hand has the preference, and should any chance not be gained, it stands over to the next deal.

MATRIX. (*matrix*, μητρη.) The womb. See UTERUS.

MATRIX is also applied to places proper for the generation of vegetables, minerals, and metals. Thus the earth is the matrix wherein seeds sprout; and marcasites are by many considered as the matrices of metals.

MATRON. *s* (*matrone*, French; *matrona*, Latin.) 1. An elderly lady (*Tatler*). 2. An old woman (*Pope*).

MATRONS (Jury of). When a widow feigns herself with child in order to exclude the next heir, and a supposititious birth is suspected to be intended, then, upon the writ *de ventre inspiciendo*, a jury of women is to be impanelled to try the question whether the woman is with child or not. So, if a woman is convicted of a capital offence, and, being condemned to suffer death, pleads in stay of execution, that she is pregnant, a jury of matrons is impanelled to inquire into the truth of the allegation; and if they find it true, the convict is respited till after her delivery.

MATRONA, in ancient geography, a river separating Gallia Celtica from the Belgica

(Cæsar). Now the Marne, which rising in Champaign near Langres, runs north-west, and then west, and passing by Meaux falls into the Seine at Charenton, two leagues to the east of Paris.

MA'TRONAL. *a.* (*matronalis*, Latin) Suitable to a matron; constituting a matron (*Bacon*).

MATRONALIA, a Roman festival instituted by Romulus, and celebrated on the kalends of March, in honour of Mars. It was kept by matrons in particular, and bachelors were entirely excluded from any share in the solemnity. The men during this feast sent presents to the women, for which a return was made by them at the Saturnalia.

MA'TRONLY. *a.* (*matron* and *like*.) Elderly; ancient (*L'Estrange*).

MATROSSES, a name heretofore given to soldiers in the artillery, who are next to the gunners, and assist them in loading, firing, and spunging the great guns. They are now, however, called second gunners. They carry firelocks, and march along with the store-waggons, both as a guard, and to give their assistance in case a waggon should break down.

MATSYS (Quintin), an historical and portrait painter, born at Antwerp in 1460. He was brought up to the trade of a blacksmith, which he abandoned, and became a most excellent artist. A descent from the cross, in the cathedral of Antwerp, is spoken of as his masterpiece. He died in 1529. His son John was also a good painter, but not equal to the father.

MATTEI (Paolo da), an historical painter, born at Naples in 1661. He became the disciple of Luca Giordano, and acquired an exact method of imitating the works of the greatest masters. He died in 1728.

MA'TTER. *s.* (*matiere*, Fr. *materia*, Lat.) 1. Body; substance extended (*Newton*). 2. Materials; that of which any thing is composed (*Bacon*). 3. Subject; thing treated (*Dryden*). 4. The whole; the very thing supposed (*Tillotson*). 5. Affair; business (*Bacon*). 6. Cause of disturbance (*Shakspeare*). 7. Subject or suit of complaint (*Acts*). 8. Import; consequence; importance; moment (*Shakspeare*). 9. Thing; object; that which has some particular relation (*Bacon*). 10. Question considered (*South*). 11. Space or quantity nearly computed (*L'Estrange*). 12. Purulent running (*Wiseman*). 13. *Upon the* MATTER. With respect to the main; nearly: out of use (*Sanderson*).

MATTER, in physiology, whatever is extended and capable of making resistance: hence, because all bodies, whether solid or fluid, are extended, and do resist, we conclude that they are material, or made up of matter. That matter is one and the same thing in all bodies, and that all the variety we observe arises from the various forms and shapes it puts on, seems very probable, and may be concluded from a general observation of the procedure of nature in the generation and destruction of bodies. Thus, for instance, water, rarified by heat, becomes vapour; great collections of vapours form clouds; these condensed descend in the form of hail or rain; part of this collected on the earth constitutes rivers; another part mixing with the earth enters into the roots of plants, and supplies matter to, and expands itself into various species of vegetables. In each vegetable it appears in one shape in the root, another in the stalk, another in the flowers, another in the seeds, &c. From hence various bodies proceed; from the oak, houses, ships, &c. from hemp and flax we have thread; from thence our various kinds of linen; from thence garments; these degenerate into rags, which receive from the mill the various forms of paper; hence our books.

According to sir Isaac Newton, it seems highly probable, that God in the beginning formed matter into solid, massy, impenetrable, moveable particles, or atoms, of such sizes and figures, and with such other properties, and in such proportion to space, as most conduced to the end for which he formed them; and that these primitive particles being solids, are incomparably harder than any porous bodies compounded of them, even so hard as never to wear or break in pieces; no ordinary power being able to divide what God himself made one in the first creation. While these particles continue entire, they may compose bodies of one and the same nature and texture in all ages; but should they wear away, or break in pieces, the nature of things depending on them may be changed. Water and earth, composed of old worn particles and fragments of particles, would not be of the same nature and texture now, with water and earth composed of entire particles in the beginning; and therefore, that nature may be lasting, the changes of corporeal things are to be placed only in the various separations and new associations of motions of these permanent particles, compound bodies being apt to break, not in the midst of solid particles, but where these particles are laid together, and only touch in a few points.

Dr. Berkeley argues against the existence of matter itself; and endeavours to prove that it is a mere *ens rationis*, and has no existence out of the mind. Some late philosophers have advanced a new hypothesis concerning the nature and essential properties of matter.

The first of these who suggested, or at least published an account of this hypothesis, was M. Boscovich, in his Theoria Philosophiæ Naturalis. He supposes, that matter is not impenetrable, but that it consists of physical points only, endued with powers of attraction and repulsion, taking place at different distances, that is, surrounded with various spheres of attraction and repulsion; in the same manner as solid matter is generally supposed to be. Provided therefore that any body move with a sufficient degree of velocity, or have sufficient momentum to overcome any power of repulsion that it may meet with, it will find no difficulty in making its way through any body whatever. If the velocity of such a body in motion be sufficiently great, Boscovich contends, that the particles of

any body through which it passes will not even be moved out of their place by it.

With a degree of velocity something less than this, they will be considerably agitated, and ignition might perhaps be the consequence, though the progress of the body in motion would not be sensibly interrupted; and with a still less momentum it might not pass at all. Mr. Michell, Dr. Priestley, and some others of our own country, are of the same opinion. See Priestley's History of Discoveries relating to Light, p. 390. In conformity to this hypothesis, this author maintains, that matter is not that inert substance that it has been supposed to be; that powers of attraction or repulsion are necessary to its very being, and that no part of it appears to be impenetrable to other parts. Accordingly, he defines matter to be a substance, possessed of the property of extension, and of powers of attraction or repulsion, which are not distinct from matter, and foreign to it, as it has been generally imagined, but absolutely essential to its very nature and being: so that when bodies are divested of these powers, they become nothing at all. In another place, Dr. Priestley has given a somewhat different account of matter: according to which it is only a number of centres of attraction and repulsion; or more properly of centres, not divisible, to which divine agency is directed; and as sensation and thought are not incompatible with these powers, solidity, or impenetrability, and consequently a vis inertiæ only having been thought repugnant to them, he maintains that we have no reason to suppose that there are in man two substances absolutely distinct from each other. See Disquisitions on Matter and Spirit.

But Dr. Price, in a correspondence with Dr. Priestley, published under the title of A Free Discussion of the Doctrines of Materialism and Philosophical Necessity, 1778, has suggested a variety of unanswerable objections against this hypothesis of the penetrability of matter, and against the conclusions that are drawn from it. The vis inertiæ of matter, he says, is the foundation of all that is demonstrated by natural philosophers concerning the laws of the collision of bodies. This, in particular, is the foundation of Newton's philosophy, and especially of his three laws of motion. Solid matter has the power of acting on other matter by impulse; but unsolid matter cannot act at all by impulse; and this is the only way in which it is capable of acting, by any action that is properly its own. If it be said, that one particle of matter can act upon another without contact and impulse, or that matter can, by its own proper agency, attract or repel other matter which is at a distance from it, then a maxim hitherto universally received must be false, that "nothing can act where it is not." Newton, in his letters to Bentley, calls the notion, that matter possesses an innate power of attraction, or that it can act upon matter at a distance, and attract and repel by its own agency, an absurdity into which he thought no one could possibly fall. And in another place he expressly disclaims the notion of innate gravity, and has taken pains to shew that he did not take it to be an essential property of bodies. By the same kind of reasoning pursued, it must appear, that matter has not the power of attracting and repelling; that this power is the power of some foreign cause, acting upon matter according to stated laws; and consequently that attraction and repulsion, not being actions, much less inherent qualities of matter, as such, it ought not to be defined by them. And if matter has no other property, as Dr. Priestley asserts, than the power of attracting and repelling, it must be a nonentity; because this is a property that cannot belong to it. Besides, all power is the power of something; and yet if matter is nothing but this power, it must be the power of nothing; and the very idea of it is a contradiction. If matter be not solid extension, what can it be more than mere extension?

Farther, matter that is not solid, is the same with pore; and therefore it cannot possess what philosophers mean by the momentum or force of bodies, which is always in proportion to the quantity of matter in bodies, void of pore.

From this disquisition it is obvious to infer that matter is not eternal and uncaused, nor the eternal effect of an eternal cause. We see that matter is a sluggish, inactive lump; not only endued, but utterly incapable of being endued with any active power. Its nature consists in being solidly extended, or so extended as to resist. Resistance is fundamental in its nature; and hence arises an impossibility of its effecting what it resists, viz. any change of its present state. If we should conceive it once placed in any part of the immensity of space (though we could not even conceive it placed at first in that part rather than another without some external cause to determine this particular location): if, we say, we should conceive it once thus placed, we must after that conceive it to remain in that place to all eternity; to continue in that shape or figure, and with the same relative situation of its parts, without any possibility of change or variation, unless we allow of an immaterial cause, which could effect a change in such a dead substance. And in consequence of this it appears that a universal, indesinent, various impulse, from an immaterial cause is necessary to be impressed upon it, to effect all those changes it undergoes, and to produce all those regular and beautiful vicissitudes which we behold in nature, and that the incessant and universal influence of this cause is that which constantly supports the material world. It is also proveable that this inert substance can only resist in proportion to its quantity, and since the least parts make (in fact) the greatest resistance, that they may not be put out of their relative situations among themselves, this itself (that is, cohesive force) must be the power of this immaterial cause, indesinently impressed upon, and exerted in every possible part of matter. And since without this these least parts could not cohere at all, or make a solid resisting substance; it appears that the energy of this cause thus incessantly

put forth through all its possible parts is that which constitutes the solidity and resistance of matter. And hence again it follows that, as the power of this cause constantly exerted, constitutes the nature and solidity of matter now; so it could not have been a solid resisting substance at first, or for any the least time, without the energy of this cause thus exerted. And thus the great question concerning the rise and origin of matter seems to be naturally and easily determined. For it must have been a thing caused at whatever time it may have been brought into existence; since nothing can be more against reason than to suppose that such a dead, inactive, substance (a substance which wants the power of a foreign cause to be indesinently put forth upon it, that it may be what it is), should nevertheless be a thing uncaused and independent. Without this foreign influence to effect cohesion and solidity in it, we could not conceive it at all to be a substance. Let us go as far as we can in the subdivision of parts, so long as we allow those parts to be solid and extended, we must allow them to be solid and extended by this external power exerted: and if they are not solid and extended parts, they cannot be parts of solid and extended substances.

This carries the point beyond the reach of objection: for to say there might have been some incomplete subject or substratum, eternal and self-existent, which the power of this cause (by being exerted in it) constituted into a solid, resisting substance, would be to speak not only unintelligibly but absurdly. What could this incomplete, self-existent thing be? It could not be matter, or solid and resisting substance; but some unsubstantial phantom of matter. And we may demand a reason from the patrons of eternal and uncaused matter, why an incomplete unsubstantial phantom of matter should be eternal and uncaused; since the substance in its complete nature would only be a dependent effect? It cannot be that a half-finished, imperfect thing, should have a better claim to self-existence than that whose nature is full and complete.

But even if the eternity of matter were admitted, the object of those who contend for it would not thereby be gained; for it would not thence follow that the Deity might be excluded, even in thought. The reasoning of the poet Young is decisive on this point; and with it we shall terminate this article.

"Whence earth and these bright orbs?—Eternal?
Grant matter was eternal; still these orbs
Would want some other father:—much design
Is seen in all their motions, all their makes;
Design implies intelligence and art:
That can't be from themselves—or man: That art
Man scarce can comprehend, could man bestow?
And nothing greater yet allow'd than man.—
Who motion, foreign to the smallest grain,
Shot through vast masses of enormous weight?
Who bid brute matter's restive lump assume
Such various forms, and gave it wings to fly?
Has matter innate motion? Then each atom
Asserting its indisputable right
To dance, would form an universe of dust:
Has matter none? Then whence these glorious forms,
And boundless flights, from shapeless and repos'd?
Has matter more than motion? Has it thought,
Judgment and genius? Is it deeply learn'd
In mathematics? Has it fram'd such laws
Which, but to guess, a Newton made immortal?
If so, how each sage atom laughs at me,
Who think a clod inferior to a man!
If art to form; and counsel to conduct;
And that with greater far than human skill,
Resides not in each block; a Godhead

To MA'TTER. *v. n.* (from the noun.) 1. To be of importance; to import (*B. Jonson*). 2. To generate matter by suppuration (*Sidney*).

To MA'TTER. *v. a.* To regard; not to neglect (*Bramston*).

MA'TTERY. *a.* (from *matter.*) Purulent; generating matter (*Harvey*).

MATTHEO (St.), a town of Arragon, in Spain, 55 miles N. of Valencia. Lat. 40. 12 N. Lon. 0. 36 W.

MATTHEO (St.), or ST. MATTHEW, an island of the Atlantic ocean, about 420 miles distant from the coast of Africa. The Portuguese planted it, but have since deserted it. Lat. 1. 24 S. Lon. 6. 10 W.

MATTHEW (St.), the son of Alpheus, was also called Levi. He was of Jewish original, as both his names discover, and probably a Galilean. Before his call to the apostolate he was a publican or toll-gatherer to the Romans; an office of bad repute among the Jews, on account of the covetousness and exaction of those who managed it: St. Matthew's office particularly consisting in gathering the customs of all merchandize that came by the sea of Galilee, and the tribute that passengers were to pay who went by water. And here it was that Matthew sat at the receipt of custom when our Saviour called him to be a disciple. It is probable that, living at Capernaum, the place of Christ's usual residence, he might have some knowledge of him before he was called. Matthew immediately expressed his satisfaction in being called to this high dignity, by entertaining our Saviour and his disciples at a great dinner at his own house, whither he invited all his friends, especially those of his own profession, hoping, probably, that they might be influenced by the company and conversation of Christ. St. Matthew continued with the rest of the apostles till after our Lord's ascension. For the first eight years afterwards he preached in Judæa. Then he betook himself to propagating the gospel among the Gentiles, and chose Ethiopia as the scene of his apostolical ministry;

where it is said he suffered martyrdom, but by what kind of death is not known.

MATTHEW THE EVANGELIST'S DAY (St.), a festival of the Christian church, observed on September 21st.

MATTHEW, or GOSPEL OF ST. MATTHEW, a canonical book of the New Testament. St. Matthew wrote his Gospel in Judæa, at the request of those he had converted; and it is thought he began in the year 41, eight years after Christ's resurrection. It was written, according to the testimony of all the ancients, in the Hebrew or Syriac language; but the Greek version, which now passes for the original, is as old as the apostolical times.

The authenticity of the two first chapters of Matthew's Gospel has been called in question, especially by those who disbelieve the miraculous conception of our Lord. On this subject we have the following judicious remarks by Dr. Marsh, in the notes to Michaelis:

"The evidence of the Greek manuscripts is decidedly in favour of the authenticity of the two first chapters of St. Matthew's Gospel. Equally decisive is the testimony of the ancient versions; for these chapters are contained in all of them. That in some few Latin manuscripts the genealogy is separated from the remaining part of the first chapter, and that St. Matthew's Gospel is made to begin with chap. i. 18, is a circumstance which is not only much too trivial to be opposed to the weight of evidence on the other side, but, at the furthest, can affect only the genealogy, and not the whole of the two first chapters. In fact, such writers of Latin manuscripts, as wrote the genealogy apart from the rest of the Gospel, were actuated not by critical, but theological motives. They found difficulty in reconciling the genealogy in Matthew i. with that of Luke iii. and therefore wished to get rid of it. Consequently it is highly uncritical to take their manuscripts even into consideration. With respect to the quotations of ancient writers, which form the third kind of evidence, it is sufficient to observe, that both Clement of Alexandria and Origen have quoted from the two chapters in question, without signifying any suspicion of their want of authenticity. And what is still more, even Celsus, the great enemy of the Christian religion in the second century, has quoted from them. We must set, therefore, all the laws of criticism at defiance, if we assert that the Greek Gospel of St. Matthew, to which alone the preceding arguments relate, began with ch. iii. εν δε ταις ημεραις εκειναις. That the Greek gospel ever began in this manner is in itself likewise incredible, since no writer, unless something preceded, would say 'in *those* days.'

"On the other hand, however evident it may be, that the Greek gospel of St. Matthew, from its very first existence, contained the two first chapters, yet, as this gospel is a translation from the Hebrew (that is, Chaldee) of St. Matthew, it is still possible, that they were not contained in the original, that the original began, as Epiphanius says the gospel used by the Ebionites began, with the words, 'it happened in the days of Herod the king, &c.' that the Greek translator prefixed a translation of some other Chaldee document containing an account of Christ's birth, and that, in order to connect it with the commencement of his original, he altered 'the days of Herod' to 'those days.' All this is possible: but it would be a very difficult matter to render it probable. It appears indeed from the Dissertation on the origin of our three first Gospels, ch. xv. that before any of our canonical gospels was composed, there existed an Hebrew (that is, Chaldee) narrative of Christ's transactions, which contained only so much matter as is common to the three first Evangelists, and therefore did not contain what is related in Matth. i. ii. But then it is further shewn in the same chapter, that this document formed only the basis of St. Matthew's gospel, and that the Evangelist himself made very considerable additions and improvements. There is no improbability therefore in the supposition, that the two first chapters were added by the Evangelist himself, especially since the Hebrew gospel used by the Nazarenes really contained them, as appears from notes 10, 11: and there is great reason to believe that the Hebrew gospel used by the Nazarenes approached much nearer to St. Matthew's genuine original than that which was used by the Ebionites, since the Nazarenes were descendants of the first converts to Christianity, the Christians of Judea being called Ναζωραιοι, Acts xxiv. 5. while the Greek Christians were called Χριστιανοι, Acts xi. 26. Absolute certainty on this subject is, indeed, not to be obtained for want of sufficient data: but the same want of data makes it impossible to prove that St. Matthew was not the author of the chapters in question.—Among the various writers on this subject, no one has displayed more critical judgment than professor Rau of Erlangen, in a short Latin dissertation published at Erlangen in 1793, entitled Symbolæ ad quæstionem de authentia i. et ii. cap. Evangelii Matthæi discutiendam."

There is likewise an admirable defence of the authenticity of the first two chapters of Matthew's Gospel in the Quarterly Review, vol. i. p. 320—330, which we regret it is not consistent with our narrow limits to extract.

MATTHEW CANTACUZENUS, son of John emperor of the East, and his associate in the empire in 1354. John abdicated the throne some time after, on which Matthew remained emperor with John Palæologus. These two princes at length disagreed, and had recourse to arms. A battle was fought between them in Thrace, and Matthew being defeated and taken prisoner, was compelled to make a formal renunciation of the throne to his rival.

MATTHEW of Westminster, an English historian of the 14th century. He was a benedictine monk, and left a chronicle in Latin, entitled, Flores Historiarum, per Matthæum Westmonasteriensem collecti, præcipuè de Rebus Britannicis ab exordio Mundi, usque ad ann. 1307, published at London in 1567, and

at Frankfort in 1601, folio. He is remarkable for his strict attention to veracity.

MATTHIAS's DAY (St.), a festival of the Christian church observed on the 24th of January.—St. Matthias was an apostle of Jesus Christ, who was chosen by lot after the treason and death of Judas Iscariot.

MATTHIOLA. In botany, a genus of the class pentandria, order monogynia; corol tubular, superior, undivided; calyx entire; drupe with a globular nut. One species, an American tree, with scattered ovate leaves; and pinnate bractes.

MA'TTOCK. *s.* (mattuc, Saxon.) 1. A kind of toothed instrument to pull up weeds (*Shakspeare*). 2. A pickaxe (*Brown*).

MA'TTRESS. *s.* (*matras*, French.) A kind of quilt made to lie upon (*Dryden*).

MATTUSCKHŒA. In botany, a genus of the class pentandria, order monogynia. Calyx four-parted; corol funnel-form, four-cleft; seeds four, naked. One species, a hairy plant of Guiana.

MATURANTS, in surgery, applications which promote the suppuration of tumors.

MATURA'TION. *s.* (from *maturo*, Latin.) 1. The state of growing ripe (*Bacon*). 2. The act of ripening (*Bentley*).

MATURATION. (from *maturo*, to make ripe.) A term in surgery, signifying that process which succeeds inflammation, by which pus is collected in an abscess.

MA'TURATIVE. *a.* (from *maturo*, Latin.) 1. Ripening; conducive to ripeness (*Brown*). 2. Conducive to the suppuration of a sore.

MATU'RE. *a.* (*maturus*, Latin.) 1. Ripe; perfected by time (*Prior*). 2. Brought near to a completion (*Shakspeare*). 3. Well-disposed; fit for execution; well digested.

To MATU'RE. *v. a.* (*maturo*, Latin.) 1. To ripen; to advance to ripeness (*Bacon*). 2. To advance toward perfection (*Pope*).

MATU'RELY. *ad.* (from *mature*,) 1. Ripely; completely. 2. With counsel well-digested (*Swift*). 3. Early; soon (*Bentley*).

MATU'RITY. *s.* (*maturitas*, Latin.) Ripeness; completion (*Rogers*).

MATY (MATTHEW, M.D.), an eminent physician and polite writer, was born in Holland in 1718. He took his degree of M.D. at Leyden; and in 1740 came to settle in England, his father having determined to quit Holland for ever. In order to make himself known, in 1749 he began to publish in French an account of the productions of the English press, printed at the Hague under the name of the Journal Britannique. This journal, which continues to hold its rank among the best of those which have appeared since the time of Bayle, answered the chief end he intended by it, and introduced him to the acquaintance of some of the most respectable literary characters of the country he had made his own. It was to their active and uninterrupted friendship he owed the places he afterwards possessed. In 1758 he was chosen fellow; and in 1765, on the resignation of Dr. Birch, who died a few months after, and made him his executor, secretary to the Royal Society. He had been appointed one of the under librarians of the British Museum at its first institution in 1753, and became principal librarian at the death of Dr. Knight in 1772. Useful in all these posts, he promised to be eminently so in the last, when he was seized with a languishing disorder, which in 1776 put an end to a life which had been uniformly devoted to the pursuit of science and the offices of humanity. He was an early and active advocate for inoculation; and when there was a doubt entertained that one might have the small-pox this way a second time, he tried it upon himself unknown to his family. He was a member of the medical club (with the Drs. Parsons, Templeman, Fothergill, Watson, and others), which met every fortnight in St. Paul's church-yard. He was twice married, viz. the first time to Mrs. Elizabeth Boisragon, and the second to Mrs. Mary Deners. He left a son and three daughters. He had nearly finished the Memoirs of the earl of Chesterfield, which were completed by his son-in-law Mr. Justamond, and prefixed to that nobleman's Miscellaneous Works, 1777, 2 vols. 4to.

MATY (Paul Henry), M A. F.R.S. son of the former, was educated at Westminster, and Trinity college, Cambridge, and had their travelling fellowship for three years. He was afterwards chaplain to lord Stormont at Paris, in 17 . . , and soon after vacated his next fellowship by marrying one of the three daughters of Joseph Clark, esq. sister of the late captain Charles Clark (who succeeded to the command on the death of captain Cooke). On his father's death in 1776, he succeeded to the office of one of the under librarians of the British Museum, and was afterwards preferred to a superior department, having the care of the antiquities, for which he was eminently well qualified. In 1776 he also succeeded his father in the office of secretary to the Royal Society. On the disputes respecting the reinstatement of Dr. Hutton in the department of secretary for foreign correspondence, 1784, Mr. Maty took a warm and distinguished part, and resigned the office of secretary; after which he undertook to assist gentlemen or ladies in perfecting their knowledge of the Greek, Latin, French, and Italian classics. Mr. Maty was a thinking, conscientious man; and having conceived some doubts about the articles he had subscribed in early life, he never could be prevailed upon to place himself in the way of ecclesiastical preferment, though his connections were amongst those who could have served him essentially in this point; and soon after his father's death he withdrew himself from ministering in the established church, his reasons for which he published in the 47th volume of the Gent. Magazine, p. 466. His whole life was thenceforwards taken up in literary pursuits. He received 100*l.* from the duke of Marlborough, with a copy of that beautiful work the Gemmæ Marlburienses, of which only 160 copies were worked off for presents; and of which Mr. Maty wrote the French account, as Mr. Bryant

did the Latin. In January 1782 he set on foot a Review of Publications, principally foreign, which he carried on, with great credit to himself and satisfaction to the public, for near five years, when he was obliged to discontinue it from ill health. He had long laboured under an asthmatic complaint, which at times made great ravages in his constitution, and at last put a period to his life in January 1787, at the age of 42; leaving behind him one son.—Mr. Maty enjoyed a respectable rank in the republic of letters, and by his talents and attainments was fully entitled to it. He was eminently acquainted with ancient and modern literature, and particularly conversant in critical researches. The purity and probity of his nature were unquestionable; and his humanity was as exquisite as it would have been extensive, had it been seconded by his fortune.

MAUCAUCO, MACACO, or MAKI, in zoology. See LEMUR.

MAUBEUGE, a fortified town of France, in the department of the North, and late province of French Hainault, with a late abbey of noble canonesses. In September 1793 the Austrians formed the blockade of this place, but were driven from their position in the following month. It is seated on the Sambre, 12 miles south of Mons, and 40 south-west of Brussels. Lon. 4. 5 E. Lat. 50. 15 N.

MAUDLIN. In botany, a name given to one or two species of the genus achillea.

MA'UDLIN. *a.* Drunk; fuddled (*Southern*).

MA'UGRE. *ad.* (*malgré*, French.) In spite of; notwithstanding: out of use (*Burnet*).

MA'VIS. *s.* (*mauvis*, French.) A thrush. See TURDUS.

To MAUL. *v. a.* (from *malleus*, Latin.) To beat; to bruise; to hurt in a coarse or butcherly manner (*Dryden*).

MAUL. *s.* (*malleus*, Latin.) A heavy hammer: commonly written *mall* (*Proverbs*).

MAULDAH, a city of Hindustan Proper, in Bengal, situate on a river that communicates with the Ganges. It arose out of the ruins of Gour, which are in its neighbourhood; and is a place of trade, particularly in silk, 190 miles N. of Calcutta. Lon. 88. 28 E. Lat. 25. 10 N.

MAULEON, a town of France, in the department of the Lower Pyrenees, situate on the frontiers of Spain, 20 miles SW of Pau, and 40 SE. of Dax. Lon. 0. 31 W. Lat. 43. 10 N.

MAULEON, a town of France, in the department of Vendée, with a late famous Augustine abbey. It is seated near the river Oint, 52 miles NE. of Rochelle, and 52 NW. of Poitiers. Lon. 0. 36 W. Lat 46. 54 N.

MAUNCH, in heraldry, the figure of an ancient coat sleeve, borne in many gentlemen's escutcheons.

MAUND. *s.* (manđ, Sax.) A hand-basket.

To MA'UNDER. *v. n.* (*maudire*, French.) To grumble; to murmur (*Wiseman*).

MA'UNDERER. *s.* (from *maunder*.) A murmurer; a grumbler.

MAUNDY THURSDAY, is the Thursday in Passion week, which was called Maundy or Mandate Thursday, from the command which our Saviour gave his apostles to commemorate him in the Lord's supper, which he this day instituted; or from the new commandment which he gave them to love one another, after he had washed their feet as a token of his love to them.

MAUPERTUIS (Peter Louis Morceau de), a celebrated French mathematician and philosopher, was born at St. Malo in 1698, and was there privately educated till he attained his 16th year, when he was placed under the celebrated professor of philosophy, M. le Blond, in the college of la Marche, at Paris; while M. Guisnée, of the Academy of Sciences, was his instructor in mathematics. For this science he soon discovered a strong inclination, and particularly for geometry. He likewise practised instrumental music in his early years with great success; but fixed on no profession till he was 20, when he entered into the army; in which he remained about 5 years, during which time he pursued his mathematical studies with great vigour. After that time he devoted himself entirely to science, and in 1723 became a member of the French Academy, and about five years after was chosen a fellow of the Royal Society of London. In 1736 he was sent with other academicians to the North, to determine the figure of the earth, which service they performed with reputation. At the invitation of the prince of Prussia, afterwards Frederic the Great, he went to Berlin, and was appointed president, and director of the academy there. He was of an irritable temper, and had a dispute with Koenig, professor of philosophy at Franeker, and another with Voltaire, who exerted his satirical talents against him. He died at Basil on a visit to the Bernouillis in 1759.

The works which he published were collected into 4 vols. 8vo. published at Lyons, in 1756, where also a new and elegant edition was printed in 1768. These contain the following works: 1. Essay on Cosmology.—2. Discourse on the different Figures of the Stars.—3. Essay on Moral Philosophy.—4. Philosophical Reflections upon the Origin of Languages, and the Signification of Words.—5. Animal Physics, concerning Generation, &c.—6. System of Nature, or the Formation of Bodies.—7. Letters on various subjects.—8. On the Progress of the Sciences.—9. Elements of Geography.—10. Account of the Expedition to the Polar Circle, for determining the Figure of the Earth; or the Measure of the Earth at the Polar Circle.—11. Account of a Journey into the Heart of Lapland, to search for an ancient Monument.—12. On the Comet of 1742.—13. Various Academical Discourses, pronounced in the French and Prussian Academies.—14. Dissertation upon Languages.—15. Agreement of the different Laws of Nature, which have hitherto appeared incompatible.—16. Upon the Laws of Motion.—17. Upon the Laws of Rest.—18. Nautical Astronomy.—19. On the Parallax of the Moon.—20. Operations for determining

the Figure of the Earth, and the Variations of Gravity.—21. Measure of a Degree of the Meridian at the Polar Circle.

Besides these works Maupertuis was author of a great multitude of interesting papers, particularly those printed in the Memoirs of the Paris and Berlin Academies, far too numerous here to mention, viz. in the Memoirs of the Academy at Paris from the year 1724 to 1749, and in those of the Academy of Berlin from the year 1746 to 1756.

MAUR (St.), a disciple of St. Benedict, and abbot of Glauseuil in Anjou. He died about 584. At the beginning of the 17th century was founded a famous congregation of benedictines of St. Maur, which has produced many learned men.

MAURA (St.), an island in the Mediterranean, near the coast of Albania, 15 miles N.E. of the island of Cephalonia. Lon. 20. 46 E. Lat. 39. 2 N.

MAURANDA, in botany, a genus of the class didynamia, order angiospermia. Calyx five-parted; corol campanulate, unequal; filaments callous at the base; capsules two, united, half five-valved at the top. One species; a climbing shrub of Mexico, with nodding violet flowers.

MAURE (St.), a town of France, in the department of Indre and Loire, 17 miles S. of Tours, and 148 S.W. of Paris. Lon. 0. 42 E. Lat. 47. 9 N.

MAUREPAS (John Frederic Philypeaux, count of), a French statesman, was born in 1701, and at the age of 14 appointed secretary at court. In 1728 he became superintendant of the marine, and in 1738 minister of state; but in 1749 he was banished to Bourges, by the intrigues of a lady who was powerful at court. In 1774 he was recalled to the ministry by Louis XVI. who put the greatest confidence in him. He was a man of profound knowledge, and great liberality; but the advice he gave to the king to meddle in the dispute between England and America is a reflection on him. He died in 1781.

MAURICE (St.), a town of Swisserland, in the Vallais, situate on the Rhone, between two high mountains, 16 miles N.W. of Martigny. It guards the entrance into the Lower Vallais.

MAURICEAU (Francis), a French surgeon, who applied himself with great success and reputation to the theory and practice of his art for several years at Paris. Afterwards he confined himself to the disorders of pregnant and lying-in-women, and was at the head of all the operators in this way. His Observations sur la grossesse et sur l'accouchement des femmes, sur leurs maladies, et celles des enfans nouveaux, 1694, in 4to. is reckoned an excellent work, and has been translated into several languages; German, Flemish, Italian, English: and the author himself translated it into Latin. It is illustrated with cuts. He published another piece or two, by way of supplement, on the same subject; and died at Paris in 1709.

MAURITANIA, an ancient kingdom of Africa, bounded on the west by the Atlantic ocean, on the south by Getulia or Libya Interior, and on the north by the Mediterranean, and comprehending the greater part of the kingdoms of Fez and Morocco. Its ancient limits are not exactly mentioned by any historian: neither can they now be ascertained by any modern observations, these kingdoms being but little known to Europeans.

This country was originally inhabited by a people called Mauri, concerning the etymology of which name authors are not agreed. It is probable, however, that this country, or at least a great part of it, was first called Phut, since it appears from Pliny, Ptolemy, and St. Jerom, that a river and territory not far from Mount Atlas went by that name. From the Jerusalem Targum it likewise appears, that part of the Mauri may be deemed the offspring of Lud the son of Misraim, since his descendants, mentioned Genesis x. are there called מורטאי, Mauri, or Mauritani. It is certain, that this region, as well as the others to the eastward of it, had many colonies planted in it by the Phœnicians. Procopius tells us, that in his time two pillars of white stone were to be seen there, with the following inscription, in the Phœnician language and character, upon them: "We are the Canaanites, that fled from Joshua the son of Nun, that notorious robber." Ibnu Rachic, or Ibnu Raquig, an African writer cited by Leo, together with Evagrius and Nicephorus Callistus, assert the same thing.

The Mauritanians, according to Ptolemy, were divided into several cantons or tribes. The Metagonitæ were seated near the straits of Hercules, now those of Gibraltar. The Saccosii, or Cacosii, occupied the coast of the Iberian sea. Under these two petty nations the Masices, Verues, and Verbicæ or Vervicæ, were settled. The Salisæ, or Salinsæ, were situated lower, towards the ocean; and still more to the south the Volubiliani. The Maurensii and Herpiditani possessed the eastern part of this country, which was terminated by the Mulucha. The Angaucani or Jangacaucani, Nectiberes, Zagrensii, Baniubæ, and Vacuntæ, extended themselves from the southern foot of Ptolemy's Atlas Minor to his Atlas Major. Pliny mentions the Baniuræ, whom father Hardouin takes to be Ptolemy's Baniubæ; and Mela the Atlantes, whom he represents as possessed of the western parts of this district.

The earliest prince of Mauritania mentioned in history is Neptune; and next to him were Atlas and Antæus his two sons, both famous in the Grecian fables on account of their wars with Hercules.

MAURITIA. Ginkgo. In botany, a genus of the class diœcia, order hexandria. Male; an oblong, sessile ament; calyx one-leaved, cup-shaped, entire; corol one-petalled, with a short tube and three-parted border; filaments inserted in the throat of the tube. Fem.; unknown. One species; a Surinam tree nearly leafless, with flexuous branches, terminating in clasping sheaths, with a cup-shaped knee-joint. The height is about that of a walnut-tree; bark ash-coloured; wood brittle; pith

soft and fungous. The flowers are in aments, and are succeeded by a fruit somewhat resembling an apricot-stone, but much larger, containing a large kernel of the sweetness of an almond, often eaten at repasts after dinner to promote digestion from its pleasant bitter.

MAURITIUS. See Isle of France.

MAUROLICO (Francis), an Italian mathematician, was born at Messina in 1494. He was abbe of Santa Maria del Porto in Sicily, and taught mathematics with great reputation. He died in 1575. His works are, 1. An edition of the Spherics of Theodosius. 2. Emendatio et restitutio Conicorum Apollonii Pergæi. 3. Archimedis Monumenta omnia. 4. Euclidis Phænomena, &c.

MAUVUA, one of the Society islands, in the South Pacific Ocean, surrounded by a reef of rocks, without a harbour. Lon. 152. 35 W. Lat. 16. 26 S.

MAUSOLEUM, a magnificent tomb, or funeral monument. The word is derived from Mausolus, king of Caria, to whom Artemisia, his widow, erected a most stately monument, esteemed one of the wonders of the world, and called it, from his name, Mausoleum.

MAW. *s.* (maga, Saxon.) 1. The stomach of animals (*Sidney*). 2. The craw of birds (*Arbuthnot*).

Maw-seed, in botany. See Papaver.

MAWES (St.), a town in the county of Cornwall, seated on the east side of Falmouth haven, in lon. 5. 26 W. lat. 50. 30 N. Though but a hamlet of the parish of St. Just, two miles off, without a minister, or either church, chapel, or meeting-house, it has sent members to parliament ever since 1562, who are returned by its mayor or portreve. It consists but of one street, under a hill, and fronting the sea, and its inhabitants subsist purely by fishing. King Henry VIII. built a castle here, over against Pendennis, for the better security of Falmouth haven. It has a governor, a deputy, and two gunners, with a platform of guns. Here is a fair the Friday after St. Luke's day.

MA'WKISH. *a.* (perhaps from *maw.*) Apt to give satiety; apt to cause loathing (*Pope*).

MA'WKISHNESS. *s.* (from *mawkish.*) Aptness to cause loathing.

MA'WMET. *s.* (or *mammet*; from *mam* or *mother.*) A puppet, anciently an idol.

MA'WMISH. *a.* (from *maw* or *mawmet.*) Foolish; idle; nauseous (*L'Estrange*).

MAXENTIUS (Marcus Aurelius Valerius), Roman emperor, was the son of Maximianus Hercules, and declared himself Augustus in 306. He was opposed by Galerius Maximianus, who was defeated, and slew himself. Maxentius then marched into Africa, where he became odious by his cruelties. Constantine afterwards defeated him in Italy, and he was drowned in crossing the Tiber in 312.

MAXILLA. (*maxilla*, from μασσαω, to chew.) In anatomy, the jaw.

Maxilla inferior. Os maxillare inferius. Mandibula. The maxilla inferior, or lower jaw, which, in its figure, may be compared to a horse-shoe, is at first composed of two distinct bones: but these, soon after birth, unite together at the middle of the chin, so as to form only one bone. The superior edge of this bone has, like the upper jaw, a process, called the alveolar process. This, as well as that of the upper jaw, to which it is in other respects a good deal similar, is likewise furnished with cavities for the reception of the teeth. The posterior part of the bone on each side rises perpendicularly into two processes, one of which is called the coronoid, and the other the condyloid process. The first of these is the highest: it is thin and pointed; and the temporal muscle, which is attached to it, serves to elevate the jaw. The condyloid process is narrower, thicker, and shorter than the other, terminating in an oblong, rounded head, which is formed for a moveable articulation with the cranium, and is received into the fore part of the fossa described in the temporal bone. In this joint there is a moveable cartilage, which being more closely connected to the condyle than to the cavity, may be considered as belonging to the former. This moveable cartilage is connected with both the articulating surface of the temporal bone and the condyle of the jaw, by distinct ligaments arising from its edges all round. These attachments of the cartilage are strengthened, and the whole articulation secured, by an external ligament, which is common to both, and which is fixed to the temporal bone, and to the neck of the condyle. On the inner surface of the ligament, which attaches the cartilage to the temporal bone, and backwards in the cavity, is placed what is commonly called the gland of the joint; at least the ligament is there found to be much more vascular than at any other part. At the bottom of each coronoid process, on its inner part is a foramen or canal, which extends under the roots of all the teeth, and terminates at the outer surface of the bone near the chin. Each of these foramina affords a passage to an artery, vein, and nerve, which send off branches to the several teeth.

This bone is capable of many motions. The condyles, by sliding from the cavity towards the eminences on each side, bring the jaw horizontally forwards, as in the action of biting; or the condyles only may be brought forwards, while the rest of the jaw is tilted backwards, as is the case when the mouth is open. The condyles may also slide alternately backwards and forwards from the cavity to the eminence, and vice versa; so that while one condyle advances, the other moves backwards, turning the body of the jaw from side to side, as in grinding the teeth. The great use of the cartilages seems to be that of securing the articulation, by adapting themselves to the different inequalities in these several motions of the jaw, and to prevent any injuries from friction. This last circumstance is of great importance where there is so much motion, and accordingly this cartilage is found in the different tribes of carnivorous animals where there is no eminence and cavity, nor other apparatus for grinding.

The aveolar processes are formed of an external and internal plate, united together by thin bony partitions, which divide the processes at the fore part of the jaw into as many sockets as there are teeth. But at the posterior part, where the teeth have more than one root, each root has a distinct cell. These processes in both jaws begin to be formed with the teeth, accompany them in their growth, and disappear when the teeth fall. So that the loss of the one seems constantly to be attended with the loss of the other.

MAXILLA SUPERIOR. Os maxillare superius. The superior maxillary bones constitute the most considerable portion of the upper jaw, are two in number, and generally remain distinct through life. Their figure is exceedingly irregular, and not easily to be described. On each of these bones is observed several eminences. One of these is at the upper and fore part of the bone, and, from its making part of the nose, is called the nasal process. Internally, in the inferior portion of this process, is a fossa, which, with the os unguis, forms a passage for the lachrymal duct. Into this nasal process likewise is inserted the short round tendon of the masculus orbicularis palpebrarum. Backwards and outwards, from the root of the nasal process, the bone helps to form the lower side of the orbit, and this part is therefore called the orbitar process. Behind this orbitar process the bone forms a considerable tuberosity, and at the upper part of this tuberosity is a channel, which is almost a complete hole. In this channel passes a branch of the fifth pair of nerves, which, together with a small artery, is transmitted to the face through the external orbitar foramen, which opens immediately under the orbit. Where the bone on each side is joined to the os malæ, and helps to form the cheeks, is observed what is called the malar process. The lower and anterior parts of the bone make a kind of circular sweep, in which are the alveoli or sockets for the teeth; this is called the alveolar process. This alveolar process has posteriorly a considerable tuberosity on its internal surface. Above this alveolar process, and just behind the fore teeth, is an irregular hole, called the foramen incisivum, which separating into two, and sometimes more holes, serves to transmit small arteries and veins, and a minute branch of the fifth pair of nerves to the nostrils. There are two horizontal lamellæ behind the alveolar process, which, uniting together, form part of the roof of the mouth, and divide it from the nose. This partition being seated somewhat higher than the lower edge of the alveolar process, gives the roof of the mouth a considerable hollowness. Where the ossa maxillaria are united to each other they project somewhat forwards, leaving between them a furrow, which receives the inferior portion of the septum nasi. Each of these bones is hollow, and forms a considerable sinus under its orbitar part. The sinus, which is usually, though improperly, called antrum Highmorianum, is lined with the pituitary membrane. It answers the same purposes as the other sinuses of the nose, and communicates with the nostrils by an opening, which appears to be a large one in the skeleton, but which in the recent subject is much smaller. In the fœtus, instead of these sinuses, an oblong depression only is observed at each side of the nostrils, nor is the tuberosity of the alveolar process then formed. On the side of the palate in young subjects a kind of fissure may be noticed, which seems to separate the portion of the bone which contains the dentes incisores from that which contains the dentes canini. This fissure is sometimes apparent till the sixth year, but after that period it in general wholly disappears.

The ossa maxillaria not only serve to form the cheeks, but likewise the palate, nose, and orbits; and, besides their union with each other, they are connected with the greatest part of the bones of the face and cranium, viz. with the ossa nasi, ossa malarum, ossa unguis, ossa palati, os frontis, os sphenoides, and os ethmoides.

MAXILLARY ARTERIES, in anatomy. These are branches of the external carotid. The external maxillary is the fourth branch of the carotid; it proceeds anteriorly, and gives off the facial or mental, the coronary of the lips, and the angular artery. The internal maxillary is the next branch of the carotid; it gives off the sphæno-maxillar, the inferior alveolar, and the spinous artery.

MAXILLARY GLANDS. The glands so called are conglomerate, and situated under the angles of the lower jaw. The inexcretory ducts are called Warthonian, after their discoverer.

MAXILLARY NERVES. The superior and inferior maxillary nerves are branches of the fifth pair of trigemini. The former is divided into the sphæno-palatine, posterior alveolar, and the infra-orbital nerve. The latter is divided into two branches, the internal lingual, and one more properly called the inferior maxillary.

MA'XIM. *s.* (*maximum*, Lat.) An axiom; a general principle; a leading truth. See AXIOM.

MAXIMA. (Latin.) The longest note formerly used in music, being equal to two longs, four breves, eight semibreves, &c. See the word LARGE.

MAXIMILIAN I. archduke of Austria, was the son of Frederic IV. created king of the Romans in 1486, and elected emperor on the death of his father in 1493. He had several wars with France, which were mostly successful. He formed the design of making himself pope, and actually endeavoured to prevail on Julius II. to admit him as coadjutor. He was, however, a man of science, and wrote Memoirs of his own life, and some poems. He died in 1519.

MAXIMILIAN II. emperor of Germany, was the son of the emperor Ferdinand I. and elected king of the Romans in 1562. He was chosen king of Hungary and Bohemia, and succeeded his father in 1564. He died at Ratisbon in 1576, aged 50.

MAXIMIANUS (Herculius Marcus Au-

relius Valerius), a native of Sirmium, in Pannonia, served as a common soldier in the Roman armies, and was raised as colleague to the imperial throne by Diocletian. Maximianus shewed the justness of the choice of Diocletian by his victories over the barbarians. Soon after Diocletian abdicated the imperial purple, and obliged Maximianus to follow his example, but, before the first year of his resignation had elapsed, he re-assumed the imperial dignity, and shewed his ingratitude to his son, by wishing him to resign the sovereignty, and to sink into a private person. Maximianus, after this, acted with the greatest perfidy to his son Maxentius and to Constantine, in Gaul, and was at last left to choose the manner of his own death by Constantine. He strangled himself at Marseilles, A.D. 310, in the 60th year of his age.—2. Galerius Valerius, a native of Dacia, who, in the first years of his life, was employed in keeping his father's flocks. He entered the army, where his valour and bodily strength recommended him to the notice of his superiors, and particularly to Diocletian, who invested him with the imperial purple in the East, and gave him his daughter Valeria in marriage. He conquered the Goths, the Dalmatians, and checked the insolence of the Persians. In a battle, however, with the king of Persia, Galerius was defeated, and, to complete his ignominy, Diocletian obliged him to walk behind his chariot arrayed in his imperial robes. He afterwards wiped away this disgrace by gaining a complete victory over the Persians. He was, as soon as Diocletian had abdicated, proclaimed Augustus, A.D. 304, but his cruelty soon rendered him odious, and the Roman people, offended at his oppression, raised Maxentius to the imperial dignity the following year. He died in the greatest agonies, A.D. 311.

MAXIMINUS (Caius Julius Verus), the son of a peasant of Thrace. He was originally a shepherd, and entered the Roman armies, where he gradually rose to the first offices. On the death of Alexander Severus he caused himself to be proclaimed emperor, A.D. 235. The popularity which he had gained when general of the armies was at an end when he ascended the throne. He was delighted with acts of the greatest barbarity, and no less than 400 persons lost their lives on the false suspicion of having conspired against the emperor's life. They died in the greatest torments; some were exposed to wild beasts, some were nailed on crosses, while others were shut up in the bellies of animals just killed. The noblest of the Romans were the objects of his cruelty. Such is the character of the suspicious and tyrannical Maximinus. In his military capacity he acted with the same ferocity, and, in an expedition in Germany, he not only cut down the corn, but he totally ruined and set fire to the whole country, to the extent of 450 miles. He was at length assassinated by his soldiers in his tent, before the walls of Aquileia, A.D. 236, in the 65th year of his age. The news of his death was received with the greatest rejoicings at Rome, public thanksgivings were offered, and whole hecatombs flamed on the altars. Maximinus has been represented of gigantic size and strength. He generally eat forty pounds of flesh every day, and drank 18 bottles of wine; he could alone draw a loaded waggon, and often broke the hardest stones between his fingers, and cleft trees with his hands. (*Herodianus.*) Maximinus made his son of the same name emperor as soon as he was invested with the purple, and his choice was unanimously approved by the senate, by the people, and by the army.

MAXIMUM, denotes the greatest state or quantity attainable in any given case, or the greatest value of a variable quantity. By which it stands opposed to minimum, which is the least possible quantity in any case.

As in the algebraical expression a^2-bx, where a and b are constant or invariable quantities, and x a variable one. Now it is evident that the value of this remainder or difference, a^2-bx, will increase as the term bx, or x, decreases; and therefore that will be the greatest when this is the smallest; that is, a^2-bx is a maximum, when x is the least, or nothing at all.

Again, the expression or difference $a^2-\frac{b}{x}$, evidently increases as the fraction $\frac{b}{x}$ diminishes; and this diminishes as x increases; therefore the given expression will be the greatest, or a maximum, when x is the greatest or infinite.

Also, if along the diameter of a circle, a perpendicular ordinate be conceived to move, it is evident that it increases continually till it arrive at the centre, where it is at the greatest state; and from thence it continually decreases again, as it moves along, and quite vanishes at the other extremity of the diameter. So that the maximum state of the ordinate is equal to the radius of the circle.

Methodus de maximis et minimis, a method of finding the greatest or least state or value of a variable quantity.

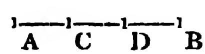
Some quantities continually increase, and so have no maximum but what is infinite; as the ordinates of the parabola. Some continually decrease, and so their least or minimum state is nothing; as the ordinates to the asymptotes of the hyperbola. Others increase to a certain magnitude, which is their maximum, and then decrease again; as the ordinates of the circle. And others again decrease to a certain magnitude, which is their minimum, and then increase again; while others admit of several maxima and minima.

The first maxima and minima are found in the Elements of Euclid, or flow immediately from them: thus, it appears by the 5th prop. of book 2, that the greatest rectangle that can be made of the two parts of a given line, any how divided, is when the line is divided equally in the middle; prob. 7, book 3, shews that the greatest line that can be drawn from a given point within a circle, is that which passes

through the centre; and that the least line that can be so drawn is the continuation of the same to the other side of the circle: prop. 8 ib. shews the same for lines drawn from a point without the circle: and thus other instances might be pointed out in the Elements:—Other writers on the maxima and minima are, Apollonius, in the whole 5th book of his conic sections; and in the preface or dedication to that book, he says others had then also treated the subject, though in a slighter manner.—Archimedes; as in prop. 9, of his Treatise on the Sphere and Cylinder, where he demonstrates that, of all spherical segments under equal superficies, the hemisphere is the greatest.—Serenus, in his 2d book, or that on the Conic Sections.—Pappus, in many parts of his Mathematical Collections; as in lib. 3, prop. 28, &c. lib. 6, prop. 31, &c. where he treats of some curious cases of variable geometrical quantities, shewing how some increase and decrease both ways to infinity; while others proceed only one way, by increase or decrease, to infinity, and the other way to a certain magnitude; and others again both ways to a certain magnitude, giving a maximum and minimum; also lib. 7, prop. 13, 14, 165, 166, &c. And all these are the geometrical maxima and minima of the ancients; to which may be added some others of the same kind, viz. Viviani De Maximis et Minimis Geometrica Divinatio in quintum Conicorum Apollonii Pergæi, in fol. at Flor. 1659; also an ingenious little tract in Thomas Simpson's Geometry, on the Maxima et Minima of Geometrical Quantities, and a nearly similar one in Legendre's Geometry. The subject has likewise been considered geometrically by Lhuillier, by Dr. Horsley in vol. 75 of the Phil. Transac. and by Dr. Gregory in the 3d vol. of Dr. Hutton's Course of Mathematics.

Other writings on the maxima and minima are chiefly treated in a more general way by the modern analysis; and first among these perhaps may be placed that of Fermat. This, and other methods, are best referred to, and explained by the ordinates of curves. For when the ordinate of a curve increases to a certain magnitude, where it is greatest, and afterwards decreases again, it is evident that two ordinates on the contrary sides of the greatest ordinate may be equal to each other; and the ordinates decrease to a certain point, where they are at the least, and afterwards increase again; there may also be two equal ordinates, one on each side of the least ordinate. Hence then an equal ordinate corresponds to two different abscisses, or for every value of an ordinate there are two valves of abscisses. Now as the difference between the two abscisses is conceived to become less and less, it is evident that the two equal ordinates, corresponding to them, approach nearer and nearer together; and when the differences of the abscisses are infinitely little, or nothing, then the equal ordinates unite in one, which is either the maximum or minimum. The method hence derived then, is this: Find two values of an ordinate, expressed in terms of the abscisses: put those two values equal to each other, cancelling the parts that are common to both, and dividing all the remaining terms by the difference between the abscisses, which will be a common factor in them: next, supposing the abscisses to become equal, that the equal ordinates may concur in the maximum or minimum, that difference will vanish, as well as all the terms of the equation that include it; and therefore, striking those terms out of the equation, the remaining terms will give the value of the absciss corresponding to the maximum or minimum.

For example, suppose it were required to find the greatest ordinate in a circle KMQ. Pl. 103. fig. 1. Put the diameter $KZ=a$, the absciss $KL=x$, the ordinate $LM=y$; hence the other part of the diameter is $LZ=a-x$, and consequently, by the nature of the circle $KL \times LZ$ being equal LM^2, $x \times \overline{a-x}$ or $ax-x^2=y^2$. Again, put another absciss $KP=x+d$, where d is the difference LP, the ordinate PQ being equal to LM or y; here then again $KP \times PZ = PQ^2$, or $(x+d) \times (a-x-d)=ax-x^2-2dx+ad-d^2=y^2$; put now these two values of y^2 equal to each other, so shall $ax-x^2=ax-x^2-2dx+ad-d^2$; cancel the common terms ax and x^2, then $0=-2dx+ad-d^2$, or $2dx+d^2=ad$; divide all by d, so shall $2x+d=a$, a general equation derived from the equality of the two ordinates. Now, bringing the two equal ordinates together, or making the two abscisses equal, their difference d vanishes, and the last equation becomes barely $2x=a$, or $x=\frac{1}{2}a$, $=KN$, the value of the absciss KN when the ordinate NO is a maximum, viz. the greatest ordinate bisects the diameter. And the operation and conclusion it is evident will be the same, to divide a given line into two parts, so that their rectangle shall be the greatest possible.



For a second example, let it be required to divide the given line AB into two such parts, that the one line drawn into the square of the other may be the greatest possible. Putting the given line $AB=a$, and one part $AC=x$; then the other part CB will be $a-x$, and therefore $x^2 \times \overline{a-x} = ax^2-x^3$ is the product of one part by the square of the other. Again, let one part be $AD=x+d$, then the other part is $a-x-d$, and $(x+d)^2 \times (a-x-d) = ax^2-x^3-3dx^2+(2ad-3d^2).\ x+ad^2-d^3$. Then, putting these two products equal to each other, cancelling the common terms ax^2-x^3, and dividing the remainder by d, there results $0=-3x^2+(2a-3d)\cdot x+ad-d^2$; hence, cancelling all the terms that contain d, there remains $0=-3x^2+2ax$, or $3x=2a$, and $x=\frac{2}{3}a$; that is, the given line must be divided into two parts in the ratio of 3 to 2. See Fermat's Opera Varia, pa. 63, and his Letters to F. Mersenne.

The next method was that of John Hudde, given by Schooten among the additions to Des Cartes's Geometry, near the end of the 1st vol. of his edition. This method is also drawn from the property of an equation that has two

equal roots. He there demonstrates that, having ranged the terms of an equation, that has two roots equal, according to the order of the exponents of the unknown quantity, taking all the terms over to one side, and so making them equal to nothing on the other side; if then the terms in that order be multiplied by the terms of any arithmetical progression, the resulting equation will still have one of its roots equal to one of the two equal roots of the former equation. Now since, by what has been said of the foregoing method, when the ordinate of a curve, admitting of a maximum or minimum, is expressed in terms of the abscissa, that abscissa, or the value of x, will be twofold, because there are two ordinates of the same value; that is, the equation has at least two unequal roots or values of x: but when the ordinate becomes a maximum or minimum, the two abscisses unite in one, and the two roots, or values of x, are equal; therefore, from the above said property, the terms of this equation for the maximum or minimum being multiplied by the terms of any arithmetical progression, the root of the resulting equation will be one of the said equal roots, or the value of the absciss x when the ordinate is a maximum.

Although the terms of any arithmetic progression may be used for this purpose, some are more convenient than others; and Mr. Hudde directs to make use of that progression which is formed by the exponents of x, viz. to multiply each term by the exponent of its power, and putting all the resulting products equal to nothing; which, it is evident, is exactly the same process as taking the fluxions of all the terms, and putting them equal to nothing; being the common process now used for the same purpose.

Thus, in the former of the two foregoing examples, where $ax - x^2$, or y^2, is to be a maximum; mult. by 1 2
gives - - $ax - 2x^2 = 0$; hence $2x = a$, and $x = \frac{1}{2}a$, as before.

And in the 2d example, where $ax^2 - x^3$, is to be a maximum; mult. by - - 2 3
gives - - - - - - $2ax^2 - 3x^3 = 0$; hence $2a - 3x = 0$, or $3x = 2a$, and $x = \frac{2}{3}a$, as before.

The next general method, and which is now usually practised, is that of Newton, or the method of Fluxions, which proceeds upon a principle different from that of the two former methods of Fermat and Hudde. These proceed upon the idea of the two equal ordinates of a curve uniting into one, at the place of the maximum and minimum; but Newton's upon the principle, that the fluxion or increment of an ordinate is nothing, at the point of the maximum or minimum; a circumstance which immediately follows from the nature of that doctrine: for, since a quantity ceases to increase at the maximum, and to decrease at the minimum, at those points it neither increases nor decreases; and since the fluxion of a quantity is proportional to its increase or decrease, therefore the fluxion is nothing at the maximum or minimum. Hence this rule: Take the fluxion of the algebraical expression denoting the maximum or minimum, and put it equal to nothing; and that equation will determine the value of the unknown letter or quantity in question.

So in the first of the two foregoing examples, where it is required to determine x when $ax - x^2$ is a maximum: the fluxion of this is $a\dot{x} - 2x\dot{x} = 0$; divide by $\dot{x}$, so shall $a - 2x = 0$, or $a = 2x$, and $x = \frac{1}{2}a$.

Also, in the 2d example, where $ax^2 - x^3$ must be a maximum; here the fluxion is $2ax\dot{x} - 3x^2\dot{x} = 0$; hence $2a - 3x = 0$, or $2a = 3x$, and $x = \frac{2}{3}a$.

When a quantity becomes a maximum or minimum, and is expressed by two or more affirmative and negative terms, in which only one variable letter is contained; it is evident that the fluxion of the affirmative terms will be equal to the fluxion of the negative ones; since their difference is equal to nothing.

And when, in the expression for the fluxion of a maximum or minimum, there are two or more fluxionary letters, each contained in both affirmative and negative terms; the sum of the terms containing the fluxion of each letter will be equal to nothing: for, in order that any expression be a maximum or minimum, which contains two or more valuable quantities, it must produce a maximum or minimum, if but one of those quantities be supposed variable. So if $ax - 2xy + by$ denote a minimum; its fluxion is $a\dot{x} - 2y\dot{x} - 2x\dot{y} + b\dot{y}$; hence $a\dot{x} - 2y\dot{x} = 0$, and $b\dot{y} - 2x\dot{y} = 0$; from the former of these $y = \frac{1}{2}a$, and from the latter $x = \frac{1}{2}b$. Or, in such a case, take the fluxion of the whole expression, supposing only one quantity variable; then take the fluxion again, supposing another quantity only variable: and so on, for all the several variable quantities; which will give the same number of equations for determining those quantities. So, in the above example, $ax - 2xy + by$, the fluxion is $a\dot{x} - 2y\dot{x} = 0$, supposing only x variable; which gives $y = \frac{1}{2}a$: and the fluxion is $-2x\dot{y} + b\dot{y} = 0$, when y only is variable; which gives $x = \frac{1}{2}b$; the same as before.

Farther, when any quantity is a maximum or minimum, all the powers or roots of it will be so too; as will also the result be, when it is increased or decreased, or multiplied, or divided by a given or constant quantity; and the logarithm of the same will be also a maximum or minimum.

To find whether a proposed algebraic quantity admits of a maximum or minimum.—Every algebraic expression does not admit of a maximum or minimum, properly so called; for it may either increase continually to infinity, or decrease continually to nothing; in both which cases there is neither a proper maximum nor minimum; for the true maximum is that value to which an expression increases, and after which it decreases again; and the minimum is that value to which the expression decreases, and after that it increases again.

Therefore when the expression admits of a maximum, its fluxion is positive before that point, and negative after it: but when it admits of a minimum, its fluxion is negative before, and positive after it. Hence, take the fluxion of the expression a little before the fluxion is equal to nothing, and a little after it; if the first fluxion be positive, and the last negative, the middle state is a maximum; but if the first fluxion be negative, and the last positive, the middle state is a minimum. See Maclaurin's Fluxions, book 1, chap. 9, and book 2, chap. 5, art. 859. (*Hutton's Math. Dict.*)

To distinguish whether a quantity is a maximum or a minimum, or both, we may, supposing that a shews the value of x corresponding to the max. or min. substitute in the quantity proposed instead of x, $a+q$, and $a-q$, successively. If the two extreme results are real and smaller than that of the mean, the quantity is a max.: if, on the contrary, the extreme results are larger than the mean one, the quantity is a min.: but if one of the extreme results be imaginary and the other real, the quantity is at the same time a max. and a min., as in the case of QR which is a max. with regard to the branch PNR, and a min. with respect to PMR, Pl. 103. fig. 2. See farther Bossut, Calcul. tom. i. pa. 207; Lacroix, Calcul. Differentiel, pa. 25; Montucla, Histoire des Mathem. tom. iii. pa. 120.

MAXIMUS (Magnus), a native of Spain, who proclaimed himself emperor, A. D. 383. The unpopularity of Gratian favoured his usurpation, and he was acknowledged by his troops. After having defeated Gratian, he demanded of the emperor Theodosius to take him associate on the throne, but Maximus was betrayed by his soldiers, at Aquileia, to the emperor Theodosius, and the conqueror, moved with compassion at the sight of his fallen and dejected enemy, granted him life; but the multitude refused him mercy, and instantly struck off his head, A. D. 388. His son Victor, who shared the imperial dignity with him, was soon after sacrificed to the fury of the soldiers.—2. Petronius, a Roman, descended of an illustrious family. He caused Valentinian III. to be assassinated, and ascended the throne. He was, after a reign of 77 days, stoned to death by his soldiers, and his body thrown into the Tyber, A.D. 455.—3. A celebrated cynic philosopher and magician of Ephesus. He instructed the emperor Julian in magic, and, according to the opinion of some historians, it was in the conversation and company of Maximus that the apostacy of Julian originated. After the death of Julian, Maximus was almost sacrificed to the fury of the soldiers, but the interposition of his friends saved his life, and he retired to Constantinople. He was soon after accused of magical practices before the emperor Valens, and beheaded at Ephesus, A.D. 366.

MAXIMUS (St.), an abbot and confessor of the 7th century, was of a noble family of Constantinople, and distinguished himself by his zeal against the Monothelites, for which he was thrown into prison, and died there on the 13th of August 1662. He wrote a Commentary on the books attributed to Dionysius the Areopagite, and several other works, of which an edition has been published by father Combesis.

MAY, the fifth month in the year, reckoning from our first, or January; and the third, counting the year to begin with March, as the Romans anciently did. It was called Maius by Romulus, in respect to the senators and nobles of his city, who were named *majores*; as the following month was called Junius, in honour of the youth of Rome, *in honorem juniorum*, who served him in the war; though some will have it to have been thus called from Maia, the mother of Mercury, to whom they offered sacrifice on the first day of it; and Papias derives it from *Madius, eo quod tunc terra madeat*. In this month the sun enters Gemini, and the plants of the earth in general begin to flower.—The month of May has ever been esteemed favourable to love; and yet the ancients, as well as many of the moderns, look on it as an unhappy month for marriage.

MAY, auxiliary verb; preterit *might*. (magan, Saxon.) 1. To be at liberty; to be permitted; to be allowed: as, *you* may *do for me all you can* (*Locke*). 2. To be possible: *the ditch* may *be filled by labour* (*Bacon*). 3. To be by chance: *a blind man* may *catch a hare* (*Shakspeare*). 4. To have power: *the king* may *pardon treason* (*Shakspeare*). 5. A word expressing desire: may *my friend live long* (*Dryden*).

MAY BE. Perhaps (*Spenser*).

MAY, in botany. See MESPELUS.

MAY-APPLE. See PODOPHYLLUM.

MAY-BUSH. See MESPILUS.

MAY-WEED. See COTULA.

MAY-LILY. See CONVALLARIA.

MAY-DUBE. See PRUNUS.

MAY-FLY, in entomology. See EPHEMERA.

MAY, a small island of Scotland, at the mouth of the Frith of Forth, with a lighthouse, seven miles S.E. of Cruil. The surrounding rocks render it almost inaccessible.

MAY-GAME. *s.* Diversion; sport; such as are used on the first of May (*Bacon*).

MAY-POLE. *s.* Pole to be danced round in May (*Pope*).

MAYER (Tobias), in biography, a very able German astronomer and mechanic in the eighteenth century, was born at Marspach, in the duchy of Wirtemberg, in the year 1723. His father was an ingenious civil-engineer, who particularly excelled in hydraulics; and young Tobias, who was fond of observing him while at work, displayed an early inquisitiveness concerning such ingenious pursuits, and from the age of four years began to design machines with the greatest dexterity and justness. The death of his father, however, whom he lost when very young, probably prevented him from being educated to that employment. Possessing but scanty means for obtaining ac-

sistance in his studies, he was obliged to rely on his own energies, by which he made himself a proficient in mathematical learning, and became qualified to be an able instructor of others. While thus occupied, he also assiduously cultivated an acquaintance with classical and polite literature, and learned to write the Latin language with elegance. So well established was his reputation when he had attained to his eight-and-twentieth year, that the university of Gottingen nominated him to the chair of mathematical professor; and not long afterwards he was admitted a member of the Royal Society in that town. From this time, every year of his short, but glorious life, was distinguished by some considerable discoveries in geometry or astronomy. He invented several useful instruments for the more commodious and exact measurement of angles on a plane. He corrected many errors in practical geometry, tracing them to their origin, in the refractions occasioned by terrestrial objects. Afterwards he particularly applied himself to study the theory of the moon, its appearances, the question of its atmosphere, and the reciprocal actions of the sun, earth, and moon upon each other. He then extended his observations to the planet Mars, and the fixed stars; determining with greater exactness than before the places of the latter, and ascertaining that, though commonly denominated fixed, they possess a certain degree of motion relative to their respective systems. Towards the end of his life the magnetic needle engaged his attention, to which he assigned more certain laws than those before received. To these various enquiries and observations he applied with such indefatigable assiduity, that he died exhausted and worn out by his labours in 1762, when only 39 years of age. His table of refractions, deduced from his astronomical observations, agrees very nicely with that of Dr. Bradley; and his theory of the moon, and astronomical tables and precepts, were so well received, that they were rewarded by the English Board of Longitude with the premium of 3,000l. which sum was paid to his widow after his decease. These tables and precepts were published by the board in the year 1770. The principal works which he gave himself to the public were, A New and General Method of resolving all Geometrical Problems, by means of Geometrical Lines, 1741, 8vo. in German. A Mathematical Atlas, in which all the Mathematical Sciences are comprised in sixty Tables, 1748, folio, in German. A Description of a Lunar Globe, constructed by the Cosmographical Society of Nuremberg, from new Observations, 1750, 4to. also in German. Several exact Maps; and some valuable papers in the Memoirs of the Royal Society of Gottingen.

MAYNOOTH, a post-town in the county of Kildare, Ireland, nearly 12 miles from Dublin. This is but a small town, and is principally celebrated for the chartered school or college for Roman-Catholics, opened there 27th of July 1759.

MAYO, one of the Cape de Verd Islands, in the Atlantic Ocean, about 17 miles in circumference. Here is corn, yams, potatoes, and plantains. Its chief commodity is salt; and ships trading to the East Indies frequently take in that article at this place. The inhabitants are negroes, who speak the Portuguese language. Lon. 23. 0 W. Lat. 15. 10 N.

Mayo, a county of Connaught, in Ireland, about 62 miles long, and 52 broad. It has the sea upon the W. and N. Galway on the S. and S.E. Roscommon on the E. and Sligo on the N.E. It is a fertile country, having vast quantities of cattle, deer, hawks and honey. The county sends two knights to parliament; and Castlebar, the only borough town in it, sends two more. A great number of Protestants were massacred here in 1641.

Mayo, once the capital town of the above county; but its principal trade is removed to Killala. Lon. 9. 39 W. Lat. 53. 40 N.

MAYOR, or Maior, the chief magistrate or governor in the cities, and most corporation-towns of England; chosen annually by his peers out of the number of the alderman. See Alderman.

The word, according to Verstegan, comes from the ancient English *maier*, able, potent, of the verb *may*, or *can*. The mayor of the place is the king's lieutenant, and, with the aldermen and common council, can make laws, called by-laws, for the government of the place. He has also the authority of a kind of judge, to determine matters, and to mitigate the rigour of the law.

King Richard I. A. D. 1189, first changed the bailiffs of London into mayors; by whose example others were afterwards appointed.

Mayors of corporations are justices of peace, *pro tempore*, and they are mentioned in several statutes; but no person shall bear any office of magistracy concerning the government of any town, corporation, &c. that hath not received the sacrament, according to the church of England, within one year before his election; and who shall not take the oaths of supremacy, &c. Stat. 13 Car. II. cap. 1.

Mayor's courts. To the lord mayor and city of London belong several courts of judicature. The highest and most ancient is that called the hustings, destined to secure the laws, rights, franchises, and customs of the city. The second is a court of request, or of consience; of which before. The third is the court of the lord mayor and aldermen, where also the sheriffs sit: to which may be added two courts of sheriffs and the court of the city orphans, whereof the lord mayor and aldermen have the custody. Also the court of common council, which is a court or assembly, wherein are made all by-laws which bind the citizens of London. It consists, like the parliament, of two houses: an upper, consisting of the lord mayor and aldermen; and a lower, of a number of common council men, chosen by

the several wards as representatives of the body of the citizens. In the court of common council are made laws for the advancement of trade, and committees yearly appointed, &c. But acts made by them are to have the assent of the lord mayor and aldermen, by stat. 11 Geo. I. Also the chamberlain's court, where every thing relating to the rents and revenues of the city, as also the affairs of servants, &c. are transacted. Lastly, to the lord mayor belong the courts of coroner and of escheator; another court for the conservation of the river Thames; another of gaol-delivery, held usually eight times a year, at the Old Bailey, for the trial of criminals, whereof the lord mayor is himself the chief judge. There are other courts called wardmotes or meetings of the wards; and courts of halymote or assemblies of the several guilds and fraternities.

MA'YORALTY. *s.* (from *mayor.*) The office of a mayor (*Bacon*).

MA'YORESS. *s.* (from *mayor.*) The wife of a mayor.

MAYOW (John), whose discoveries in chemistry have astonished the scientific part of the public, descended, says Wood, from a genteel family living at Bree in the county of Cornwall. His father was probably a younger son, bred to business; for our author was born in Fleet-street, London, in the parish of St. Dunstan's in the West. At what school he received the rudiments of his education, a circumstance which the biographers of men eminent in the republic of letters should never omit, we have not been able to learn; but on the 27th of September 1661, when he had just completed his 16th year, he was admitted a scholar of Wadham college, Oxford. Some time afterwards, on the recommendation of Henry Coventry, Esq. one of the secretaries of state, he was chosen probationer fellow of All-souls college. As Wood informs us that he had here a legist's place, an expression by which we understand a law-fellowship, it is not wonderful that he took his degrees in the civil law, though physic and the physical sciences were the favourite objects of his study. He was indeed an eminent physician, practising both in London and in Bath, but in the latter city chiefly in the summer months, till the year 1679, when he died, some time during the month of September, in the house of an apothecary in York-street, Covent Garden, and was buried in the church of that parish. He had been married, says Wood, a little before his death, not altogether to his content; and indeed he must have been very discontented, if he chose to die in the house of a friend rather than in his own. He published, Tractatus quinque medico physici, 1. De salnitro; 2. De respiratione; 3. De respiratione fœtus in utero et ovo; 4. De motu musculari et spiritibus animalibus; 5. De Rachitide. These were published together in 8vo at Oxford, in 1674; but there is an edition of two of them, De respiratione, and De Rachitide, published together at Leyden in 1671.

The fame of this author has been lately revived and extended by Dr. Beddoes, who published, in 1790, Chemical Experiments and Opinions, extracted from a work published in the last century, 8vo; in which he gives to Mayow the highest credit as a chemist, and ascribes to him some of the greatest modern discoveries respecting air, giving many extracts from the three first of his treatises. His chief discovery was, that oxygen gas, to which he gave the name of *fire air*, exists in the nitrous acid, and in the atmosphere; which he proved by such decisive experiments, as to render it impossible to explain how Boyle and Hales could avoid availing themselves, in their researches into air, of so capital a discovery. Mayow also relates his manner of passing aeriform fluids under water, from vessel to vessel, which is generally believed to be a new art. He did not collect dephlogisticated air in vessels, and transfer it from one jar to another, but he proved its existence by finding substances that would burn in vacuo, and in water when mixed with nitre; and after animals had breathed and died in vessels filled with atmospheric air, or after fire had been extinguished in them, there was a residuum which was the part of the air unfit for respiration, and for supporting fire; and he further shewed, that nitrous acid cannot be formed, but by exposing the substances that generate it to the atmosphere. Mayow was undoubtedly no common man, especially since, if the above dates are right, he was only 34 at the time of his death. But he was not so unknown as Dr. Beddoes supposed; for since the repetition of the same discovery by Priestley and Scheele, reference has frequently been made by chemists to Mayow as the original inventor; thus allowing to him a species of merit, to which he has perhaps but a doubtful claim, and which, if that claim be well founded, must certainly be shared between him and Dr. Hooke.

MAZA, among the Athenians, was a sort of cake made of flour boiled with water and oil, and set, as the common fare, before such as were entertained at the public expence in the common hall or prytaneum.

MAZAGAN, a strong place of Africa, in the kingdom of Morocco, and on the frontiers of the province of Duguela. It was fortified by the Portuguese, and besieged by the king of Morocco with 200,000 men in 1562, but to no purpose. It is situated near the sea. Lon. 7. 45 W. Lat. 33. 5 N.

MAZARA, an ancient town of Sicily, and capital of a considerable valley of the same name, which is very fertile, and watered with several rivers. The town is a bishop's see, and has a good harbour; is seated on the sea coast, in lon. 12. 39 E. lat. 37. 42 N.

MAZARIN (Julius), a famous cardinal and prime minister of France, was born at Piscina in the province of Abruzzo, in Naples, in 1602. After having finished his studies in Italy and Spain, he entered into the service of cardinal Sachetts, and became well skilled in politics,

and in the interests of the princes at war in Italy; by which means he was enabled to bring affairs to an accommodation, and the peace of Queiras was shortly concluded. Cardinal Richelieu being taken with his conduct, did from thenceforward highly esteem him; as did also cardinal Antonio, and Louis XIII. who procured him a cardinal's hat in 1641. Richelieu made him one of the executors of his will; and during the minority of Louis XIV. he had the charge of affairs. At last he became the envy of the nobility, which occasioned a civil war: whereupon Mazarin was forced to retire, a price was set on his head, and his library sold. Notwithstanding, he afterwards returned to the court in more glory than ever; concluded a peace with Spain, and a marriage treaty betwixt the king and the infanta. This treaty of peace passes for the master-piece of cardinal de Mazarin's politics, and procured him the French king's most intimate confidence: but at last his continual application to business threw him into a disease, of which he died at Vincennes in 1661.—Cardinal Mazarin was of a mild and affable temper. One of his greatest talents was his knowing mankind, and his being able to adapt himself, and to assume a character conformable to the circumstances of affairs. He possessed at one and the same time the bishopric of Metz, and the abbeys of St. Arnauld, St. Clement, and St. Vincent, in the same city; that of St. Dennis, Clugny, and Victor, of Marseilles; of St. Michael at Soissons, and a great number of others. He founded Mazarin-college at Paris, which is also called the college of the four nations. There has been published a collection of his letters, the most copious edition of which is that of 1745, in 2 vols. duodecimo.

MA'ZARD. *s.* (*maschoire*, French.) A jaw (*Shakspeare*).

MAZE. *s.* (mare, a whirlpool, *Skinner.*) 1. A labyrinth; a place of perplexity and winding passages (*Thomson*). 2. Confusion of thought; uncertainty; perplexity (*Sidney*).

To MAZE. *v. a.* (from the noun.) To bewilder; to confuse (*Spenser*).

MA'ZER. *s.* (*maeser*, Dutch.) A maple cup (*Spenser. Dryden*).

MA'ZY. *a.* (from *maze.*) Perplexed with windings; confused (*Dryden*).

M. D. *Medicinæ doctor*, doctor of physic.

ME. The oblique case of *I*.

ME'ACOCK. *s.* (*mes coq*, French. *Skinner.*) An uxorious or effeminate man.

ME'ACOCK. *a.* Tame; timorous; cowardly (*Shakspeare*).

MEAD. (mæðe, Saxon.) A wholesome, agreeable liquor, prepared of honey and water. One of the best methods of preparing mead is as follows: into twelve gallons of water slip the whites of six eggs; mixing these well together, and to the mixture adding twenty pounds of honey. Let the liquor boil an hour, and when boiled add cinnamon, ginger, cloves, mace, and a rosemary. As soon as it is cold, put a spoonful of yeast to it, and tun it up, keeping the vessel filled as it works; when it has done working, stop it up close; and, when fine, bottle it off for use.

Thorley says, that mead not inferior to the best of foreign wines may be made in the following manner: Put three pounds of the finest honey to one gallon of water, and two lemon peels to each gallon; boil it half an hour, well scummed; then put in, while boiling, lemon peel: work it with yeast; then put it in your vessel with the peel, to stand five or six months, and bottle it off for use. If it is to be kept for several years, put four pounds to a gallon of water.

The author of the Dictionary of Chemistry directs to choose the whitest, purest, and best tasted honey, and to put it into a kettle with more than its weight of water: a part of this liquor must be evaporated by boiling, and the liquor scummed, till its consistence is such, that a fresh egg shall be supported on its surface without sinking more than half its thickness into the liquor; then the liquor is to be strained, and poured through a funnel into a barrel; this barrel, which ought to be nearly full, must be exposed to a heat as equable as possible, from 20 to 27 or 28 degrees of Mr. Reaumur's thermometer, taking care that the bung-hole be slightly covered, but not closed. The phenomena of the spirituous fermentation will appear in this liquor, and will subsist during two or three months, according to the degree of heat; after which they will diminish and cease. During this fermentation, the barrel must be filled up occasionally with more of the same kind of liquor of honey, some of which ought to be kept apart, on purpose to replace the liquor which flows out of the barrel in froth. When the fermentation ceases, and the liquor has become very vinous, the barrel is then to be put into a cellar, and well closed; a year afterwards the mead will be fit to be put into bottles.

Mead is an agreeable kind of wine; nevertheless it retains long a taste of honey, which is unpleasing to some persons; but this taste it is said to lose entirely by being kept a very long time. The spirituous fermentation of honey, as also that of sugar, and of the most of vinous liquors, when it is very saccharine, is generally more difficultly effected, requires more heat, and continues longer than that of ordinary wines made from the juice of grapes; and these vinous liquors always preserve a saccharine taste, which shows that a part only of them is become spirituous

MEAD (Dr. Richard), a celebrated English physician, was born at Stepney near London, where his father, the reverend Mr. Matthew Mead, had been one of the two ministers of that parish; but in 1662 was ejected for nonconformity, but continued to preach at Stepney till his death. As Mr. Mead had a handsome fortune, he bestowed a liberal education upon 13 children, of whom Richard was the eleventh; and for that purpose kept a private tutor in his house, who taught him the Latin tongue. At 16 years of age Richard was sent to Utrecht, where he studied three years

under the famous Grævius; and then choosing the profession of physic, he went to Leyden, where he attended the lectures of the famous Pitcairn on the theory and practice of medicine, and Hermon's botanical courses. Having also spent three years in these studies, he went with his brother and two other gentlemen to visit Italy, and at Padua took his degree of doctor of philosophy and physic in 1695. Afterwards he spent some time at Naples and at Rome; and returning home the next year, settled at Stepney, where he married, and practised physic with a success that laid the foundation of his future greatness.

In 1703, Dr. Mead having communicated to the Royal Society an analysis of Dr. Bonomo's discoveries relating to the cutaneous worms that generate the itch, which they inserted in the Philosophical Transactions; this, with his account of poisons, procured him a place in the Royal Society, of which sir Isaac Newton was then president. The same year he was elected physician of St. Thomas's hospital, and was also employed by the surgeons to read anatomical lectures in their hall, which obliged him to remove into the city. In 1707 his Paduan diploma for doctor of physic was confirmed by the university of Oxford; and being patronized by Dr. Radcliffe, on the death of that famous physician he succeeded him in his house at Bloomsbury-square, and in the greatest part of his business. In 1727 he was made physician to king George II. whom he had also served in that capacity while he was prince of Wales; and he had afterwards the pleasure of seeing his two sons-in-law, Dr. Nichols and Dr. Wilmot, his coadjutors in that eminent station.

Dr. Mead was not more to be admired for the qualities of the head than he was to be loved for those of his heart. Though he was himself a hearty whig, yet, uninfluenced by party-principles, he was a friend to all men of merit, by whatever denomination they might happen to be distinguished. Thus he was intimate with Garth, with Arbuthnot, and with Freind; and long kept up a constant correspondence with the great Boerhaave, who had been his fellow-student at Leyden: they communicated to each other their observations and projects, and never loved each other the less for being of different sentiments.

No foreigner of learning ever came to London without being introduced to Dr. Mead; and on these occasions his table was always open, and the magnificence of princes was united with the pleasures of philosophers. It was principally to him that the several counties of England and our colonies abroad applied for the choice of their physicians, and he was likewise consulted by foreign physicians from Russia, Prussia, Denmark, &c. He wrote, besides the above works, 1. A Treatise on the Scurvy. 2. De variolis et morbillis dissertatio. 3. Medica sacra: sive de Morbis insignioribus, qui in Bibliis memorantur, Commentarius. 4. Monita et Præcepta medica. 5. A Discourse concerning pestilential contagion, and the methods to be used to prevent it. The works he wrote and published in Latin were translated into English, under the doctor's inspection, by Thomas Stack, M. D. and F. R. S. This great physician, naturalist, and antiquarian, died on the 16th of February 1754.

MEADOW, generally signifies pasture, or grass land, that is annually mown for hay; but it more particularly denotes such tracts of ground as are too low, and too moist for cattle to graze on them during the winter, without injuring the sward.

The best lands for meadow are those situated on a gentle declivity, so as to be irrigated at pleasure, and which at the same time possess a rich soil and moist bottom, especially if it be in the vicinity of a brook, or small running stream. See IRRIGATION.

Great Britain and Ireland are reputed to possess the most verdant pastures, and the finest natural grasses in the vegetable creation; these advantages, however, do not appear to meet with that attention which they deserve. Lately, indeed, the cultivation of grasses has been a favourite pursuit amongst experimental farmers and freeholders; but, as the tenantry in general are bound to follow a certain rotation of crops, without having the power of breaking up old and unproductive meadows, extensive improvements cannot be expected, while such limitations prevail.—We have cursorily mentioned these obstacles to national prosperity; because they would require a more ample investigation than is compatible with our limits.

The first requisite towards obtaining a good meadow is, a perfect acquaintance with the best natural grasses, their peculiar soils, and the best mode of collecting their seeds: the most valuable are those of the northern and eastern parts of England. But, as comparatively few have an opportunity of procuring such seeds, the only method that can be pursued with hopes of success appears to be that of selecting those grasses, which thrive luxuriantly on a similar soil; and to gather the ripe seed from a productive old meadow.

On lands intended for pasture, and especially for sheep, it is advisable to sow three kinds of vegetables, with a view to gain the advantage of successive growth. Thus, Mr. Parkinson sows four bushels of the seed of ray-grass, or red darnel (*lolium perenne*, L.); 10lbs. of trefoil seed (more properly common clover, *trifolium pratense*, L.); and a similar quantity of white clover (*t. repens*, L.). He is of opinion that the ray-grass should be grazed early, while the white clover is still concealed in the ground, and the trefoil, or common clover, is just appearing; that, when the darnel is eaten down, the common clover will spring up, and afford excellent food for sheep, after which the white clover will appear; and, when the latter is consumed, the ray-grass again grows, and supplies pasturage during the winter months, if the weather prove tolerably mild. Hence this truly "experienced farmer" maintains, that one-third more in number of sheep, at least,

may be thus supported than by any other method. See HUSBANDRY.

MEADOW-GRASS. See POA.

MEADOW-RUE. See THALICTRUM.

MEADOW-SAFFRON. See COLCHICUM.

MEADOW-SAXIFRAGE. See PEUCEDANUM.

MEADOW-SWEET. See SPIRÆA.

MEADOW (Queen of the). See SPIRÆA.

MEADIA, a town of Hungary, in the bannat of Temesvar, on a small river which runs into the Danube, twelve miles N. Orsova, and fifty-two SE. Temesvar.

ME'AGER. *a.* (*maigre*, French.) 1. Lean; wanting flesh; starved (*Dryden*). 2. Poor; hungry (*Dryden*).

To ME'AGER. *v. a.* (from the adjective.) To make lean (*Knolles*).

ME'AGERNESS. *s.* (from *meagre*.) 1. Leanness; want of flesh. 2. Scantiness; bareness (*Bacon*).

MEAK. *s.* A hook with a long handle (*Tusser*).

MEAL. *s.* (male, Saxon.) 1. The act of eating at a certain time (*Arbuthnot*). 2. A repast; the food eaten (*Shakspeare*). 3. A part; a fragment (*Bacon*). 4. (mælepe, Saxon; *meel*, Dutch.) The flour or edible part of corn (*Wotton*)

To MEAL. *v. a.* (*meler*, French.) To sprinkle; to mingle (*Shakspeare*).

ME'ALMAN. *s.* (*meal* and *man*.) One that deals in meal.

ME'ALY. *a.* (from *meal*.) 1. Having the taste or soft insipidity of meal; having the qualities of meal (*Arbuthnot*). 2. Besprinkled, as with meal (*Brown*).

ME'ALY-MOUTHED. *a.* Soft mouthed; unable to speak freely (*L'Estrange*).

MEALY-MOUTHEDNESS. *s.* Bashfulness; restraint of speech.

MEALY TREE PLIANT. A provincial name for the viburnum or guelder-rose.

MEAN. *a.* (mæne, Saxon.) 1. Wanting dignity; of low rank or birth. 2. Low-minded; base; ungenerous; spiritless (*Smalridge*). 3. Contemptible; despicable (*Philips*). 4. Low in the degree of any good quality; low in worth; low in power (*Dryden*). 5. (*moyen*, French.) Middle; moderate; without excess (*Sidn.*). 6. Intervening; intermediate (*Kings*).

MEAN. *s.* (*moyen*, French.) 1. Mediocrity; middle rate; medium (*Sh.*). 2. Measure; regulation: not used (*Spenser*). 3. Interval; interim; mean time (*Spenser*). 4. Instrument; measure; that which is used in order to any end (*Hooker*). 5. *By all* MEANS. Without doubt; without hesitation; without fail. 6. *By no* MEANS. Not in any degree; not at all (*Addison*). 7. Revenue; fortune (*Shakspeare*). 8. MEAN-TIME or MEAN-WHILE. In the intervening time (*Dryden. Addison*).

To MEAN. *v. n.* (*meenen*, Dutch.) 1. To have in the mind; to purpose (*Milton*). 2. To think (*Pope*).

To MEAN. *v. a.* 1. To purpose; to intend; to design (*Milton*). 2. To intend; to hint covertly; to understand (*Dryden*)

MEAN (Arithmetical), is half the sum of the extremes. So 4 is an arithmetical mean between 2 and 6, or between 3 and 5, or between 1 and 7; also an arithmetical mean between a and b is $\frac{a+b}{2}$, or $\frac{1}{2}a+\frac{1}{2}b$.

MEAN (Geometrical), commonly called a mean proportional, is the square root of the product of the two extremes; so that, to find a mean proportional between two given extremes, multiply these together, and extract the square root of the product. Thus a mean proportional between 1 and 9, is $\sqrt{1\times 9}=\sqrt{9}=3$; a mean between 2 and $4\frac{1}{2}$ is $\sqrt{2\times 4\frac{1}{2}}=\sqrt{9}=3$ also; the mean between 4 and 6 is $\sqrt{4\times 6}=\sqrt{24}$; and the mean between a and b is $\sqrt{ab}$.

MEAN (Harmonical.) See HARMONICAL PROPORTION.

MEAN AND EXTREME PROPORTION, or EXTREME AND MEAN PROPORTION, is when a line or any quantity is so divided that the less part is to the greater, as the greater is to the whole.

MEAN ANOMALY OF A PLANET, is an angle which is always proportional to the time of the planet's motion from the aphelion or perihelion, or proportional to the area described by the radius vector; that is, as the whole periodic time in one revolution of the planet, is to the time past the aphelion or perihelion, so is 360° to the mean anomaly. See ANOMALY.

MEAN CONJUNCTION OR OPPOSITION, is when the mean place of the sun is in conjunction, or opposition, with the mean place of the moon in the ecliptic.

MEAN DISTANCE OF A PLANET FROM THE SUN, is an arithmetical mean between the planet's greatest and least distances.

MEAN MOTION, is that by which a planet is supposed to move equably in its orbit; and it is always proportional to the time.

MEAN TIME, OR EQUAL TIME, is that which is measured by an equable motion, as a clock; as distinguished from apparent time, arising from the unequal motion of the earth or sun.

MEA'NDER. *s.* Maze; labyrinth; flexuous passage; serpentine winding (*Hale*).

MEA'NDROUS. *a.* (from *meander*.) Winding; flexuous.

ME'ANING. *s.* (from *mean*.) 1. Purpose; intention (*Shakspeare*). 2. Habitual intention (*Roscommon*). 3. The sense; the thing understood (*Pope*). 4. Sense; power of thinking (*Pope*).

ME'ANLY. *ad.* (from *mean*.) 1. Moderately; not in a great degree (*Dryden*). 2. Without dignity; poorly (*Milton*). 3. Without greatness of mind; ungenerously (*Prior*). 4. Without respect (*Watts*).

ME'ANNESS. *s.* (from *mean*.) 1. Want of excellence (*Hooker*). 2. Want of dignity; low rank; poverty. 3. Lowness of mind (*South*). 4. Sordidness; niggardliness.

MEANT. perf. and part. pass. of *to mean*.

MEANTES, or rather MEANTIA. In zoology, the name of a third order of amphibials, as proposed to be given by Linnéus, in order to

include the siren tribe, whose character is peculiarly ambiguous. See SIREN, as also ZOOLOGY.

MEAO, one of the small Molucca islands in the Eastern Indian sea. Lon. 127. 3 E. Greenwich. Lat. 1. 12 N.

MEARNS. See KINCARDINESHIRE.

MEASE, five hundred of herrings.

MEASLES, a cutaneous disease, attended with a fever, in which there is an appearance of eruptions that do not tend to suppuration. See MEDICINE.

ME'ASLED. *a.* (from *measles*.) Infected with the measles (*Hudibras*).

ME'ASLY. *a.* (from *measles*.) Scabbed with the measles (*Swift*).

ME'ASURABLE. *a.* (from *measure*.) 1. Such as may be measured (*Bentley*). 2. Moderate; in small quantity.

ME'ASURABLENESS. *s.* Quality of admitting to be measured.

ME'ASURABLY. *ad.* Moderately. (*Ecclus.*)

ME'ASURE. *s.* (*mesure*, French.) 1. That by which any thing is measured (*Arbuthnot*). 2. The rule by which any thing is adjusted or proportioned (*More*). 3. Proportion; quantity settled (*Hooker*). 4. A stated quantity (*Shakspeare*). 5. Sufficient quantity (*Shakspeare*). 6. Allotment; portion allotted (*Tillotson*). 7. Degree; quantity (*Abbot*). 8. Proportionate time; musical time (*Prior*). 9. Motion harmonically regulated (*Dryden*). 10. A stately dance (*Shakspeare*). 11. Moderation; not excess (*Isaiah*). 12. Limit; boundary (*Psalms*). 13. Any thing adjusted (*Smalridge*). 14. Syllables metrically numbered; metre. 15. Tune; proportionate notes (*Spenser*). 16. Mean of action; mean to an end (*Clarendon*). 17. To have hard *measure*; to be hardly treated.

To ME'ASURE. *v. a.* (*mesurer*, French.) 1. To compute the quantity of any thing by some settled rule (*Bacon*). 2. To pass through; to judge of extent by marching over (*Dryden*). 3. To judge of quantity or extent, or greatness (*Milton*). 4. To adjust; to proportion (*Taylor*). 5. To mark out in stated quantities (*Addison*). 6. To allot or distribute by measure (*Matt.*).

MEASURES, in botany. Linnéus seldom makes use of any other measure besides the proportion between the parts. Since plants vary exceedingly in the size both of the whole and all the parts, he has discarded geometrical measures, and has adopted others taken principally from the human hand and arm.

1. Capillus. A hair. The diameter of a hair. One-twelfth of a line.

2. Linea. A line. The length of the little crescent at the root of the finger nail. One-twelfth of an inch.

3. Unguis. A nail. The length of a nail. Half an inch.

4. Pollex. An inch. The length of the first joint of the thumb

5. Palmus. A palm, or hand. The breadth of the four fingers. Three inches.

6. Spithama. A short span. The space between the end of the thumb and the fore-finger extended. Seven inches.

7. Dodrans. A long span. The space between the end of the thumb and of the little finger extended. Nine inches.

8. Pes. A foot. From the bend of the elbow to the base of the thumb. Twelve inches.

9. Cubitus. A cubit. From the bend of the elbow to the end of the middle finger. Seventeen (Paris) inches: or something more than eighteen inches English.

10. Brachium. An arm. From the arm-pit to the end of the middle finger. Twenty-four inches.

11. Orgya. A fathom. The height of a man, or the space between the ends of the fingers when the arms are extended.

The above geometrical measures follow the French standard; and it should be observed that the English foot is eleven inches and a quarter French, nearly. Our hand is the breadth of the palm, or about four inches. And the Roman palm is 8.78 for architecture, and 9.79 in buying goods; English measure.

MEASURE, in geometry, denotes any quantity assumed as one, or unity, to which the ratio of other homogeneous or similar quantities is expressed. This definition is somewhat more agreeable to practice than that of Euclid, who defines measure, a quantity which being repeated any number of times becomes equal to another. This latter definition answers only to the idea of an arithmetical measure, or quota-part.

MEASURE OF AN ANGLE, is an arch described from the vertex in any place between its legs. Hence angles are distinguished by the ratio of the arches, described from the vertex between the legs to the peripheries. Angles then are distinguished by those arches; and the arches are distinguished by their ratio to the periphery: thus an angle is said to be of so many degrees as there are in the said arch. See ANGLE.

MEASURE OF A SOLID ANGLE, is the surface of the spherical triangle, or other polygon intercepted by the planes which determine the solid angle. See SOLID ANGLE.

MEASURE OF A FIGURE, or plane surface, is a square whose side is one inch, foot, yard, or some other determinate length. Among geometricians, it is usually a rod called a square rod, divided into ten square feet, and the square feet into ten square digits: hence square measures.

MEASURE OF A LINE, any right line taken at pleasure, and considered as unity. The modern geometricians use a decempeda, or perch, divided into ten equal parts, called feet; the feet they subdivide into ten digits, and the digit into ten lines, &c.

MEASURE OF THE MASS, OR QUANTITY OF MATTER, in mechanics, is its weight; it being apparent that all the matter which coheres and moves with a body gravitates with it, and it being found by experiment that the gravities of homogeneal bodies are in proportion to their bulks, hence, while the mass continues the same, the weight will be the same, whatever figure it put on; by which is meant its absolute weight, for as to its specific, that varies as the quantity of the surface varies.

MEASURE OF A NUMBER, in arithmetic, such a number as divides another without leaving any fraction: thus 9 is a measure of 27.

MEASURE OF A SOLID, is a cube whose side is one inch, foot, yard, or any other determinate length. In geometry, it is a cubic perch, divided into cubic feet, digits, &c. hence cubic measures, or measures of capacity.

MEASURE OF VELOCITY, in mechanics, the space passed over by a moving body in a given time. To

measure a velocity therefore, the space must be divided into as many equal parts as the time is conceived to be divided into; the quantity of space answering to such an article of time is the measure of the velocity.

Measure for horses, is the hand, which, by statute, contains four inches.

Measure, in a legal and commercial sense, denotes a certain quantity or proportion of any thing bought, sold, valued, or the like. It is necessary, for the convenience of commerce, that an uniformity should be observed in weights and measures, and regulated by proper standards. A foot-rule may be used as a standard for measures of length, a bushel for measures of capacity, and a pound for weights. There should be only one authentic standard of each kind, formed of the most durable materials, and kept with all possible care. A sufficient number of copies, exactly corresponding to the principal standard, may be distributed for adjusting the weights and measures that are made for common use. There are several standards of this kind both in England and Scotland. See the article Weights and Measures.

If any one of the standards above mentioned be justly preserved, it will serve as a foundation for the others, by which they may be corrected if inaccurate, or restored if entirely lost. For instance, if we have a standard foot, we can easily obtain an inch, and can make a box which shall contain a cubical inch, and may serve as a standard for measures of capacity. If it be known that a pint contains 100 cubical inches, we may make a vessel five inches square, and four inches deep, which will contain a pint. If the standard be required in any other form, we may fill this vessel with water, and regulate another to contain an equal quantity. Standards for weights may be obtained from the same foundation; for, if we know how many inches of water it takes to weigh a pound, we have only to measure that quantity, and the weight which balances it may be assumed as the standard of a pound.

Again, if the standard of a pound be given, the measure of an inch may be obtained from it: for we may weigh a cubical inch of water, and pour it into a regular vessel; and having noticed how far it is filled, we may make another vessel of like capacity in the form of a cube. The side of this vessel may be assumed as the standard for an inch; and standards for a foot, a pint, or a bushel, may be obtained from it. Water is the most proper substance for regulating standards; for all other bodies differ in weight from others of the same kind; whereas it is found by experience that spring and river water, rain, and melted snow, and all other kinds, have the same weight; and this uniformly holds in all countries when the water is pure, alike warm, and free from salt and minerals.

Thus, any one standard is sufficient for restoring all the rest.

Measures are various, according to the various kinds and dimensions of the things measured.—Hence arise lineal or longitudinal measures, for lines or lengths; square measures, for areas or superficies; and solid or cubic measures, for bodies and their capacities: all which again are very different in different countries and in different ages, and even many of them for different commodities. Whence arise other divisions of ancient and modern measures, domestic and foreign ones, dry measures, liquid measures, &c.

Long Measures, or Measures of Application.

1. The English and Scotch standards.

The English lineal standard is the yard, containing 3 English feet; equal to 3 Paris feet 1 inch and $\frac{3}{12}$ of an inch, or $\frac{7}{9}$ of a Paris ell. The use of this measure was established by Henry I. of England, and the standard taken from the length of his own arm. It is divided into 36 inches, and each inch is supposed equal to 3 barley-corns. When used for measuring cloth, it is divided into four quarters, and each quarter subdivided into 4 nails. The English ell is equal to a yard and a quarter, or 45 inches, and is used in measuring linens imported from Germany and the Low-countries.

The Scots elwand was established by king David I. and divided into 37 inches. The standard is kept in the council-chamber of Edinburgh, and, being compared with the English yard, is found to measure $37\frac{1}{5}$ inches; and therefore the Scots inch and foot are larger than the English, in the proportion of 180 to 185; but this difference being so inconsiderable, is seldom attended to in practice. The Scots ell, though forbidden by law, is still used for measuring some coarse commodities, and is the foundation of the land measure of Scotland.

Itinerary measure is the same both in England and Scotland. The length of the chain is 4 poles, or 22 yards; 80 chains make a mile. The old Scots computed miles were generally about a mile and a half each.

The reel for yarn is $2\frac{1}{2}$ yards, or 10 quarters, in circuit; 120 threads make a cut, 12 cuts make a hasp or hank, and 4 hanks make a spindle.

2. The French standard is the aune or ell, containing 3 Paris feet 7 inches 8 lines, or 1 yard $\frac{1}{6}$ English; the Paris foot royal exceeding the English by $\frac{68}{1000}$ parts, as in one of the following tables. This ell is divided two ways, viz. into halves, thirds, sixths, and twelfths; and into quarters, half-quarters, and sixteenths.

The French, however, have since their revolution formed an entirely new system of weights and measures, according to the following table.

Proportions of the measures of each species to its principal measure or unity.	First part of the name which indicates the proportion to the principal measure or unity.	PRINCIPAL MEASURES OR UNITIES.				
		Length	Capacity.	Weight.	Agrarian.	For firewood.
10,000 1,000 100 10 0 (0.1 0 01 0.001	Myria Kilo Hecto Deca Deci Centi Milli	Metre	Litre.	Gramme.	Are.	Stere.
Proportion of the principal measures between themselves, and the length of the meridian.		10,000,000th part of the dist. from the pole to the equator.	A decimetre cube.	Weight of a centimetre cube of distilled water.	100 square metres.	One cubic metre.
Value of the principal measures in the ancient French measures.		3 feet 11 lines and $\frac{1}{2}$ nearly.	1 pint and $\frac{1}{27}$, or 1 litron and $\frac{1}{4}$ nearly.	18 grains and 841,000 parts.	Two square perches des eaux et forêt.	1 demi-voie, or $\frac{1}{4}$ of a cord des eaux et forêt.
Value in English measures.		Inches 39.383.	61 042 inch. which is more than the wine and less than the beer quart.	15.444 grains.	3.95 square perches.	35.315 cubic feet.

3. The English avoirdupois pound weighs 7004 troy grains; whence the avoirdupois ounce, whereof 16 make a pound, is found equal to 437.75 troy grains. And it follows, that the troy pound is to the avoirdupois pound as 88 to 107 nearly; for as 88 to 107, so is 5760 to 7003.636: that the troy ounce is to the avoirdupois ounce, as 80 to 73 nearly; for as 80 to 73, so is 480 to 438: and, lastly, that the avoirdupois pound and ounce are to the Paris two-marc weight and ounce, as 63 to 68 nearly; for as 63 to 68, so is 7004 to 7559.873. See WEIGHT. The Paris foot expressed in decimals is equal to 1.0654 of the English foot, or contains 12.785 English inches.

4. The standard in Holland, Flanders, Sweden, a good part of Germany, many of the Hanse-towns, as Dantzick and Hamburgh, and at Geneva, Franckfort, &c. is likewise the ell; but the ell in all these places differs from the Paris ell. In Holland it contains one Paris foot 11 lines, or 4-sevenths of the Paris ell. The Flanders ell contains 2 feet 1 inch 5 lines and half a line, or 7-twelfths of the Paris ell. The ell of Germany, Brabant, &c. is equal to that of Flanders.

5. The Italian measure is the bracchio, brace, or fathom. This obtains in the states of Modena, Venice, Florence, Lucca, Milan, Mantua, Bologna, &c. but is of different lengths. At Venice it con-

tains 1 Paris foot, 11 inches, 3 lines, or 8-fifteenths of the Paris ell. At Bologna, Modena, and Mantua, the brace is the same as at Venice. At Lucca it contains 1 Paris foot, 9 inches, 10 lines, or half a Paris ell. At Florence it contains 1 foot, 9 inches, 4 lines, or 49-hundredths of a Paris ell. At Milan, the brace for measuring of silks is 1 Paris foot, 7 inches, 4 lines, or 4-ninths of a Paris ell; that for woollen cloths is the same with the ell of Holland. Lastly, at Bergama, the brace is 1 foot, 7 inches, 6 lines, or 5-ninths of a Paris ell. The usual measure at Naples, however, is the canna, containing 6 feet, 10 inches, and 2 lines, or one Paris ell and 15-seventeenths.

6. The Spanish measure is the vara or yard, in some places called the barra; containing 17 twenty-fourths of the Paris ell. But the measure in Castile and Valencia is the pan, span, or palm; which is used, together with the canna, at Genoa. In Arragon, the vara is equal to a Paris ell and a half, or 5 feet, 5 inches, 6 lines.

7. The Portuguese measure is the cavedos, containing 2 feet, 11 lines, or 4-sevenths of a Paris ell; and the vara, 106 whereof make a 100 Paris ells.

8. The Piedmontese measure is the ras, containing 1 Paris foot, 9 inches, 10 lines, or half a Paris ell. In Sicily, their measure is the canna, the same with that of Naples.

9. The Muscovite measures are the cubit, equal to 1 Paris foot, 4 inches, 2 lines; and the arcin, two whereof are equal to 3 cubits.

10. The Turkish and Levant measures are the picq, containing 2 feet, 2 inches, and 2 lines, or three-fifths of the Paris ell. The Chinese measure is the cobre, ten whereof are equal to three Paris ells. In Persia, and some parts of the Indies, the gueze, of which there are two kinds; the royal gueze, called also the gueze monkelser, containing 2 Paris feet, 10 inches, 11 lines, or four-fifths of the Paris ell; and the shorter gueze, called simply gueze, only two-thirds of the former. At Goa and Ormuz, the measure is the vara, the same with that of the Portuguese, having been introduced by them. In Pegu, and some other parts of the Indies, the cando or candi, equal to the ell of Venice. At Goa, and other parts, they use a larger cando, equal to 17 Dutch ells, exceeding that of Babel and Balsora by $\frac{7}{8}$ per centum, and the vara by 6½. In Siam, they use the ken, short of three Paris feet by one inch. The ken contains two soks, the sok two keubs, the keub 12 nious or inches, the niou to be equal to eight grains of rice, *i. e.* to about nine lines. At Camboia they use the haster; in Japan the tatam; and the span on some of the coasts of Guinea.

English Measures of Length.

Barley-corns												
3	Inch											
9	3	Palm										
27	9	3	Span									
36	12	4	1 1/3	Foot								
54	18	6	2	1½	Cubit							
108	36	12	4	3	2	Yard						
180	60	20	6 2/3	5	3 1/3	1 2/3	Pace					
216	72	24	8	6	4	2	1 1/5	Fathom				
594	198	66	22	16½	11	5½	3 3/10	2¾	Pole			
23760	7920	2640	880	660	440	220	132	110	40	Furlong		
190080	63360	21120	7040	5280	3520	1760	1056	880	320	8	Mile.	

Scripture Measures of Length, reduced to English.

								Eng. feet.	inch. Dec.
Digit								0	0.912
4	Palm							0	3.648
12	3	Span						0	10.944
24	6	2	Cubit					1	9.888
96	24	8	4	Fathom				7	3.552
144	36	12	6	1½	Ezechiel's reed			10	11.328
192	48	16	8	2	1 1/3	Arabian pole		14	7.104
1920	480	160	80	20	13½	10	Schœnus, or measuring line	145	11.04

MEASURES.

The Longer Scripture-Measures.

						English. miles.	paces.	feet.
Cubit						0	0	1.824
400	Stadium					0	145	4.6
2000	5	Sab. day's journey				0	729	3.000
4000	10	2	Eastern mile			1	403	1.000
12000	30	6	3	Parasang		4	153	3.000
96000	240	48	24	8	A day's journey	33	172	4.000

Grecian Measures of Length, reduced to English.

												English Paces.	feet.	dec
Dactylus, digit												0	0	0.7554$\frac{11}{16}$
4	Doron, dochme											0	0	3.0218$\frac{3}{4}$
10	$2\frac{1}{2}$	Lichas										0	0	7.5546$\frac{7}{8}$
11	$2\frac{3}{4}$	$1\frac{1}{10}$	Orthodoron									0	0	8.3101$\frac{9}{16}$
12	3	$1\frac{1}{5}$	$1\frac{1}{11}$	Spithame								0	0	9.0656$\frac{1}{4}$
16	4	$1\frac{6}{10}$	$1\frac{5}{11}$	$1\frac{1}{3}$	Foot							0	1	0.0875
18	$4\frac{1}{2}$	$1\frac{4}{5}$	$1\frac{7}{11}$	$1\frac{1}{2}$	$1\frac{1}{8}$	Cubit						0	1	1.5984$\frac{3}{8}$
20	5	2	$1\frac{9}{11}$	$1\frac{2}{3}$	$1\frac{1}{4}$	$1\frac{1}{9}$	Pygon					0	1	3.109 $\frac{3}{8}$
24	6	$2\frac{2}{5}$	$2\frac{2}{11}$	2	$1\frac{1}{2}$	$1\frac{1}{3}$	$1\frac{1}{5}$	Cubit larger				0	1	6.13125
96	24	$9\frac{3}{5}$	$8\frac{8}{11}$	8	6	$5\frac{1}{3}$	$4\frac{4}{5}$	4	Pace			0	6	0.525
9600	2400	960	$872\frac{8}{11}$	800	600	$533\frac{1}{3}$	480	400	100	Furlong		100	4	4.5
76800	19200	7680	$6981\frac{9}{11}$	6400	4800	$4266\frac{2}{3}$	3840	3200	800	8	Mile	805	5	0

Roman Measures of Length, reduced to English.

										English Paces.	feet.	dec.
Digitus transversus										0	0	0.725$\frac{1}{4}$
$1\frac{1}{3}$	Uncia									0	0	0.967
4	3	Palmus minor								0	0	2.901
16	12	4	Pes							0	0	11.604
20	15	5	$1\frac{1}{4}$	Palmipes						0	1	2.505
24	18	6	$1\frac{1}{2}$	$1\frac{1}{5}$	Cubitus					0	1	5.406
40	30	10	$2\frac{1}{2}$	2	$1\frac{2}{3}$	Gradus				0	2	5.01
80	60	20	5	4	$3\frac{1}{3}$	2	Passus			0	4	10.02
10000	7500	2500	625	500	$416\frac{2}{3}$	250	125	Stadium		120	4	4.5
80000	60000	20000	5000	4000	$3333\frac{1}{3}$	2000	1000	8	Milliare	967	0	0

A Table of the Measures of Length of the principal Places compared with the English Foot.

ANCIENT MEASURES.

Arabian foot	1.095
Egyptian foot	1.421
Egyptian stadium	730.8
Greek foot	1.009
—— phyletarian foot	1.167
Hebrew foot	1.212
—— cubit	1.817
—— sacred cubit	2.002

great cubit = six common cubits.

Natural foot	.814
Roman foot	.970
—— (after Titus)	.965
—— (from rules)	.9672
—— (from buildings)	.9681
—— (from a stone)	.9696
Roman mile of Pliny	4840.5
—— of Strabo	4903.
Sicilian foot of Archimedes	.730

MODERN MEASURES.

Amsterdam foot	.927
—— ell	2.233
Antwerp foot	.940
Barcelona foot	.992
Basle foot	.944
Bavarian foot	.968
Berlin foot	.992
Bologna foot	1.244
Brabant ell in Germany	2.268
Brescia foot	1.560
Brescian braccio	2.092
Brussels foot	.902
—— greater ell	2.278
—— lesser ell	2.245
China mathematical foot	1.127
—— Imperial foot	1.051
Chinese li	606.
Constantinople foot	2.195
Copenhagen foot	1.049
Dresden foot	.929
—— ell = 2 feet	1.857
Florence foot	.995
—— braccio	1.900
Genoa palm	.812
—— canna	7.300
Geneva foot	1.919
Hamburgh foot	.933
Lisbon foot	.952
Madrid foot	.915
—— vara	3 263
Malta palm	.915
Moscow foot	.928
Naples palm	.861
—— canna	6.908
Paris foot	1.066
Paris metre	3 281
Rome palm	.733
—— foot	.966
—— deto ($\frac{1}{16}$ foot)	.0604
—— oncio ($\frac{1}{12}$ foot)	.0805
—— palmo	.2515
—— palmo di architettura	.7325
—— canna di architettura	7.325
—— staiolo	4.212
—— canna dei mericanti (8 palms)	6.5365
—— braccio dei mercanti (4 palms)	2.7876
—— braccio di tessitor di tela	2.0868
—— braccio di architettura	2.561
Russian archine	2.3625
—— arschin	2.3333
—— verschock, $\frac{1}{16}$ arschin	.1458
Stockholm foot	1.073
Turin foot	1.676
—— ras	1.958
—— trabuco	10.085
Tyrol foot	1.096
—— ell	2.639
Venice foot	1.137
—— braccio of silk	2.108
—— ell	2.089
Venice braccio of cloth	2.250
Vienna foot	1.036
—— ell	2.557
—— post mile	24888.
Warsaw foot	1.169

Measures (Square or Superficial). English square or superficial measures are raised from the yard of 36 inches multiplied into itself, and thus producing 1296 square inches in the square yard: the divisions of this are square feet and inches; and the multiples, poles, roods, and acres, as in the following table:

English Square-Measures.

Inches						
144	Foot					
1296	9	Yard				
3600	25	$2\frac{7}{9}$	Pace			
39204	$272\frac{1}{4}$	$30\frac{1}{4}$	10.89	Pole		
1568160	10890	1210	435.6	40	Rood	
6272640	43560	4840	1743.6	160	4	Acre.

Roman Square-Measure reduced to English.

The integer was the jugerum or acre, which the Romans divided like the libra or as: thus the jugerum contained

	Square feet.	Scruples.	English roods.	Square poles.	Square feet.
As	28800	288	2	18	250.05
Deunx	26400	264	2	10	183.85
Dextans	24000	240	2	2	117.64
Dodrans	21600	216	1	34	51.42
Bes	19200	192	1	25	257.46
Septunx	16800	168	1	17	191.25
Semis	14400	144	1	9	125 03
Quincunx	12000	120	1	1	58.82
Triens	9600	96	0	32	264.85
Quadrans	7200	72	0	24	198.64
Sextans	4800	48	0	16	132.43
Uncia	2400	24	0	8	66.21

Note.—Actus major was 14400 square feet, equal to a semis; clima, 3600 square feet, equal to sescuncia; and actus minimus equal to a sextans.

Measures (Cubical), or Measures of capacity for Liquids. The English measures were originally raised from troy-weight; it being enacted by several statutes that eight pounds troy of wheat, gathered from the middle of the ear, and well dried, should weigh a gallon of wine-measure, the divisions and multiples whereof were to form the other measures; at the same time it was also ordered, that there should be but one liquid measure in the kingdom: yet custom has prevailed, and there having been introduced a new weight, viz. the avoirdupois, we have now a second standard gallon adjusted thereto, and therefore exceeding the former in the proportion of the avoirdupois weight to troy weight. From this latter standard are raised two several measures, the one for ale, the other for beer.

M E A S U R E S.

The sealed gallon at Guildhall, which is the standard for wines, spirits, oils, &c. is supposed to contain 231 cubic inches, and on this supposition the other measures raised therefrom will contain as in the table underneath; yet, by actual experiment, made in 1688, before the lord-mayor and the commissioners of excise, this gallon was found to contain only 224 cubic inches: it was however agreed to continue the common supposed contents of 231 cubic inches; so that all computations stand on their old footing. Hence, as 12 is to 231, so is $14\frac{1}{10}$ to $281\frac{1}{2}$ the cubic inches in the ale gallon: but in effect the ale quart contains $70\frac{1}{2}$ cubic inches, on which principle the ale and beer gallon will be 282 cubic inches. The several divisions and multiples of these measures, and their proportions, are exhibited in the following tables:

English Measure of Capacity for Liquids
Wine Measure.

Solid inches									
$28\frac{7}{8}$	Pint								
231	8	Gallon							
4158	144	18	Runlet						
$7276\frac{1}{2}$	252	$31\frac{1}{2}$	$1\frac{3}{4}$	Barrel					
9702	336	42	$2\frac{1}{3}$	$1\frac{1}{3}$	Tierce				
14553	504	63	$3\frac{1}{2}$	2	$1\frac{1}{2}$	Hogshead			
19279	672	84	$4\frac{2}{3}$	$2\frac{2}{3}$	2	$1\frac{1}{3}$	Puncheon		
29106	1008	126	7	4	3	2	$1\frac{1}{2}$	Butt	
58212	2016	252	14	8	6	4	3	2	Tun.

Jewish Measures of Capacity for Liquids, reduced to English Wine-measure.

							Gall.	pints.	Solid inches.
Caph							0	$0\frac{5}{8}$	0.177
$1\frac{1}{3}$	Log						0	$0\frac{5}{6}$	0.211
$5\frac{1}{3}$	4	Cab					0	$3\frac{1}{3}$	0.844
16	12	3	Hin				1	2	2.533
32	24	6	2	Seah			2	4	5.067
96	72	18	6	3	Bath, or Epha		7	4	15.2
960	720	180	60	30	10	Coron, or Chomer	75	5	7.625

Attic Measures of Capacity for Liquids, reduced to English Wine-measure.

										Gall.	Pints.	Solid inch. Dec.
Cochliarion										0		$0.0356\frac{5}{12}$
2	Cheme									0		$0.0712\frac{5}{6}$
$2\frac{1}{2}$	$1\frac{1}{4}$	Mystron								0	$\frac{1}{48}$	$0.089\frac{11}{48}$
5	$2\frac{1}{2}$	2	Conche							0	$\frac{1}{24}$	$0.178\frac{1}{24}$
10	5	4	2	Cyathos						0	$\frac{1}{12}$	$0.356\frac{11}{12}$
15	$7\frac{1}{2}$	6	3	$1\frac{1}{2}$	Oxybaphon					0	$\frac{1}{8}$	$0.535\frac{3}{8}$
60	30	24	12	6	4	Cotyle				0	$\frac{1}{2}$	$2.141\frac{1}{2}$
120	60	48	24	12	8	2	Xestes			0	1	4.283
720	360	288	144	72	48	12	6	Chous		0	6	25.698
8640	4320	3416	1728	864	576	144	72	12	Metretes	10	2	19.629

MEASURES.

Roman Measures of Capacity for Liquids, reduced to English Wine-measure.

Ligula	Cyathus	Acetabulum	Quartarius	Hemina	Sextarius	Congius	Urna	Am	Culeus	Gall.	Pints.	Solid inch. Dec.
Ligula										0	$0\frac{1}{48}$	$0.117\frac{5}{12}$
4	Cyathus									0	$0\frac{1}{12}$	$0.469\frac{2}{3}$
6	$1\frac{1}{2}$	Acetabulum								0	$0\frac{1}{8}$	$0.704\frac{1}{2}$
12	3	2	Quartarius							0	$0\frac{1}{4}$	1.409
24	6	4	2	Hemina						0	$0\frac{1}{2}$	2.818
48	12	8	4	2	Sextarius					0	1	5.636
288	72	48	24	12	6	Congius				0	7	4.942
1152	288	192	96	48	24	4	Urna			3	$4\frac{1}{2}$	5.33
2304	576	384	192	96	48	8	2	Am		7	1	10.66
46080	11520	7680	3840	1920	960	160	40	20	Culeus	143	3	11.095

Beer and Ale Measure.

Pints	Gallon	Firkin	Kilderkin	Barrel	Hogshead
Pints					
8	Gallon				
72	9	Firkin			
144	18	2	Kilderkin		
288	36	4	2	Barrel	
576	72	8	4	2	Hogshead.

English Dry or Corn Measure.

Solid inches	Pint	Gallon	Peck	Bushel	Quarter
Solid inches					
33.6	Pint				
268.8	8	Gallon			
537.6	16	2	Peck		
2150.4	64	8	4	Bushel	
17203.2	512	64	32	8	Quarter.

Scripture Measures of Capacity for things dry, reduced to English Corn-measure.

Gachal	Cab	Gomor	Seah	Epha	Leteeh	Chomer, or Coron	Peck.	Gall.	Pint.	Solid inch. Dec.
Gachal							0	0	$0\frac{17}{120}$	0.031
20	Cab						0	0	$2\frac{5}{6}$	0.073
36	$1\frac{4}{5}$	Gomor					0	0	$5\frac{1}{10}$	1.211
120	6	$3\frac{1}{3}$	Seah				1	0	1	4.036
360	18	10	3	Epha			3	0	3	12.107
1800	90	50	15	5	Leteeh		16	0	0	26.500
3600	180	100	30	10	2	Chomer, or Coron	32	0	1	18.969

Attic Measures of Capacity for things dry, reduced to English Corn measure.

Cochliarion	Cyathos	Oxybaphon	Cotyle	Xestes	Choenix	Medimnos	Peck.	Gal.	Pint.	Solid inch. Dec.
Cochliarion							0	0	0	$0.276\frac{7}{24}$
10	Cyathos						0	0	0	$2.763\frac{1}{2}$
15	$1\frac{1}{2}$	Oxybaphon					0	0	0	$4.144\frac{3}{4}$
60	6	4	Cotyle				0	0	0	16.579
120	12	8	2	Xestes			0	0	0	33.158
180	18	12	3	$1\frac{1}{2}$	Choenix		0	0	1	$15.705\frac{3}{4}$
8640	864	576	144	72	48	Medimnos	4	0	6	3.501

Roman Measure of Capacity for things dry, reduced to English Corn-measure.

								Peck.	Gal.	Pint.	Solid inch. Dec.
Ligula								0	0	0 $\frac{1}{48}$	0.01
4	Cyathus							0	0	0 $\frac{1}{12}$	0.04
6	1½	Acetabulum						0	0	0 $\frac{1}{8}$	0.06
24	6	4	Hemina					0	0	0 $\frac{1}{2}$	0.24
48	12	8	2	Sextarius				0	0	1	0.48
384	96	64	16	8	Semimodius			0	1	0	3.84
768	192	128	32	16	2	Modius		1	0	0	7.68

Measure is also used to signify the cadence and time observed in poetry, dancing, and music, to render them regular and agreeable. The different measures or metres in poetry are the different manners of ordering and combining the quantities, or the long and short syllables. Thus hexameter, pentameter, iambic, sapphic verses, &c. consist of different measures.

In English verses, the measures are extremely various and arbitrary, every poet being at liberty to introduce any new form that he pleases. The most usual are the heroic, generally consisting of five long and five short syllables; and verses of four feet; and of three feet and a cæsura, or single syllable.

The ancients, by variously combining and transposing their quantities, made a vast variety of different measures. Of words, or rather feet of two syllables, they formed a spondee, consisting of two long syllables; a pyrrhic, of two short syllables; a trochee, of a long and a short syllable; and an iambic, of a short and a long syllable. Of their feet of three syllables they formed a molossus, consisting of three long syllables; a tribrach, of three short syllables; a dactyl, of one long and two short syllables; and an anapæst, of two short and one long syllable. The Greek poets contrived 124 different combinations or measures, under as many different names, from feet of two syllables to those of six.

Measure, in music, the interval or space of time which the person who beats time takes between the raising and falling of his hand or foot, in order to conduct the movement, sometimes quicker and sometimes slower, according to the kind of music, or the subject that is sung or played. The measure is that which regulates the time we are to dwell on each note. See Time. The ordinary or common measure is one second or 60th part of a minute, which is nearly the space between the beats of the pulse or heart; the systole, or contraction of the heart, answering to the elevation of the hand; and its diastole, or dilatation, to the letting it fall. The measure usually takes up the space that a pendulum of two feet and a half long employs in making a swing or vibration. The measure is regulated according to the different quality or value of the notes in the piece; by which the time that each note is to take up is expressed. The semibreve, for instance, holds one rise and one fall; and this is called the measure, or whole measure; sometimes the measure-note, or time-note; the minim, one rise or one fall; and the crotchet, half a rise or half a fall, there being four crotchets in a full measure.

Measure (Binary or Double), is that wherein the rise and fall of the hand are equal.

Measure (Ternary or Triple), is that wherein the fall is double to the rise, or where two minims or crotchets are played during a fall, and but one in the rise.

Measure (Universal or Perpetual), is a kind of measure unalterable by time or place, to which the measures of different ages and nations might be reduced, and by which they may be compared and estimated. Such a measure would be very useful, if it could be attained; since, being used at all times, and in all places, a great deal of confusion and error would be avoided.

The theories of eminent men on this subject are useful, and deserve attention, as they may suggest improvements of great importance. Huygens proposed the length of a pendulum that should vibrate seconds, to be measured from the point of suspension to that of oscillation. The third part of this pendulum he termed a horary foot, and such he recommended should be the standard by which the measure of every foot in Europe might be regulated. Admitting his plan to be worthy of adoption, and an experiment made, it appears that the Paris foot would bear a proportion to the horary foot of 864 to 881, which is demonstrated in this manner: the length of three Paris feet is 864 half lines, and that of a pendulum vibrating seconds consists of 881 half lines. The principal objection to this ingenious suggestion of Huygen is founded on the assumption that the action of gravity is the same in all parts of the globe, which is certainly not the case; consequently, instead of its serving universally, it would be useful only in those places which lie under the same parallel of latitude. Thus, if each different latitude had its foot equal to the proposed third part of the pendulum vibrating seconds there, any given latitude must have a different length for the foot. Exclusive of this objection, there would be a second proceeding from the difficulty attending the exact measurement between the centres of motion and oscillation, which is such, that it is highly probable no two persons would agree in their accounts of the space.

Many attempts and expedients were suggested after the rejection of the above plan, with similar want of success. This circumstance did not escape the notice of the Society for the Encouragement of Arts, Manufactures, and Commerce, the officers of which, with a commendable zeal, advertised a premium of one hundred guineas, or a gold medal, as a reward to those who would propose the approved means "for obtaining invariable standards for weights and measures, communicable at all times and to all nations." This invitation procured a communication from Mr. Hatton, in 1779, in which he proposed the application of a moveable

point of suspension to one and the same pendulum, and by this means he intended to accomplish the full effect of two, the difference in the lengths of which was the desired measure.

The ideas of Mr. Hatton were approved by the ingenious Whitehurst, who improved upon them, and invented some very curious and excellent machinery; besides which, he published, eight years after, a work entitled An Attempt towards obtaining invariable Measures of Length, Capacity, and Weight, from the Mensuration of Time, &c. Mr. Whitehurst thought it convenient and proper for attaining this most desirable end, to endeavour to obtain a measure of the greatest convenient length from two pendulums, the vibrations of which are in the ratio of two to one, and of lengths agreeing with the English standard in whole numbers.

To explain our philosopher's intentions more fully, let us admit the supposition that the length of a pendulum vibrating seconds in the latitude of London is 39.2 inches; the length of one vibrating 42 times in a minute amounts to 80 inches; by the same unerring rule, another vibrating 84 times in a minute must be 20 inches: the difference resulting from these data is 60 inches and his proposed standard measure. Pursuing his experiments to the very acme of perfection, he found the variation in the length of the two pendulums to be 59.892 inches, instead of 60, arising from an error in the assumed length of the seconds' pendulum.

It is generally admitted, that Mr. Whitehurst has succeeded in his design, and demonstrated to the learned how an invariable standard may at any time be found for the same latitude. Besides this discovery, the world is indebted to him for the accurate ascertaining of a fact of very considerable importance in natural philosophy. A person who wrote with ability on this point observes, with respect to the fact just mentioned, "The difference between the lengths of the rods of two pendulums, whose vibrations are known, is a datum from which may be derived the true lengths of pendulums, the spaces through which heavy bodies fall in a given time, with many other particulars relative to the doctrine of gravitation, the figure of the earth," &c. Mr. Whitehurst perceived from this experiment, that the length of a seconds' pendulum vibrating in a circular arc of 3° 20′, is very nearly 39.119; but performing the same motion in the arc of a cycloid, the result would be 39.136 inches; consequently, weighty substances will descend in the first second after they are detached from their support nearly 16.094 feet, or 16.1⅛ inch.

Dr. Young, to whom we acknowledge ourselves indebted for many of the following particulars, has given an excellent compressed table of measures and standards, in his recent valuable work, A Course of Lectures on Natural Philosophy, &c. from which we find, that the English yard is said to have been derived from the length of the arm of Henry I. in the year 1101; that Graham asserts the length of the pendulum vibrating seconds accurately is equal to 39.13 inches; that Bird's parliamentary standard is admitted to be of the greatest authority, and that it agrees nearly with the scales of Shuckburgh and Pictet, made by Troughton. The standard of the Royal Society by Graham exceeds that of Bird's in length about 1000th part of an inch, but it is not quite uniform throughout its length. The standard in the Exchequer is about .0075 inch shorter than the yard of the Royal Society. General Roy used a scale of Sisson, divided by Bird, and found it to agree exactly with the Tower standard on the Royal Society's scale. Sir George Shuckburgh, adopting Troughton's scales for the standard, found the original Tower standard 36.004; the yard E. on the Royal Society's scale by Graham 36.0013 inches; the yard Exchequer of the same scale 35.9933; Roy's scale 36.0036; the Royal Society's scale by Bird 35.99955; Bird's parliamentary standard of 1758, 36.00023. The English have employed and adjusted their standards at the temperature of 62° of Fahrenheit's thermometer, and the French at the freezing point of water. The French metre is 39.37100 English inches, and the ten millionth part of the quadrant of the meridian. The same measure contains 36.9413 French inches, or 3 feet 11.296 lines. Hence, says the doctor, the French toise of 72 inches is equal to 76.736 English inches. One of Lalande's standards measured by Dr. Maskelyne was 76.732, the other 76.736. In latitude 45°, a pendulum of the length of a metre would perform in a vacuum 86116.5 vibrations in a day. The length of the second pendulum is 993827 at Paris.

The French National Institute of Sciences and Arts have turned their attention to this subject, and in the month of Nivose, in the year 1801, a member read a report from a committee, founded on the comparison of the standard metre of the Institute with the English foot. And M. Pictet, professor of natural philosophy at Geneva, exhibited to the class, in the month of Vendemiaire, a collection of the most interesting objects, which he had collected in England, relating to arts and sciences. One of the number was a standard of the English linear measure, which was of brass, 49 inches in length, and neatly divided by engraved lines into tenths of an inch. This standard was made for the exhibitor by Troughton, a resident in London, who has deservedly acquired the reputation of dividing instruments with the utmost accuracy; which was compared with another made by the same artist for sir George Shuckburgh, when it was ascertained satisfactorily, that the variations between them did not amount to more than the difference between the divisions of each; in other words, the variation was almost imperceptible. Arguing from this circumstance, the standard may be considered as identical with that described by sir George Shuckburgh in the Philosophical Transactions for 1798.

Another excellent instrument, constructed by Mr. Troughton, and shewn at the same time by M. Pictet, was a comparer, calculated to ascertain minute variations between measures. This instrument "consists of two microscopes, with cross wires, placed in a vertical situation, the surface of the scale being horizontal, and fixed at proper distances upon a metallic rod. One of them remains stationary at one end of the scale, the other is occasionally fixed near to the other end; and its cross wires are moveable by means of a screw, describing in its revolution 1-hundredth of an inch, and furnished with a circular index, dividing each turn into 100 parts; so that having two lengths, which differ only one-tenth of an inch from each other, we may determine their difference in 10-thousandths of an inch. The wires are placed obliquely with respect to the scale, so that the line of division must bisect the acute angle which they form, in order to coincide with their intersection." An instrument similar to that thus described, and made by Ramsden, for measuring the expansion of metals, was described by general Roy in the seventy-fifth vol. of the Royal Transactions.

M. Pictet, influenced by a desire of advancing science, made an offer to the class of the use of the

standard and the micrometer for the purpose of determining the comparative length of the metre and the English foot: the offer was gratefully accepted by the Society, and Messrs. Legendre, Mechain, and Prony, were appointed to assist M. Pictet in making the proposed comparison of their standard metre of platina and the measure just mentioned. The first assembling of this committee was on the 21st of October, of the same year, at the mansion of M. Lenoir. Upon commencing their operations, they found some difficulty arising from the different manner in which the measures were defined: the French standards were merely cut off to the length of a metre; but the English scale was graduated by lines; consequently the length of the former could not readily be taken by the microscopes, neither could the English scale be measured by the usual method adopted for making new standard metres, which is accomplished by fixing one extremity against a firm support, "and bringing the other into contact with the face of a cock, or slider, adjusted so as barely to admit the original standard between it and the fixed surface."

M. Lenoir endeavoured to remove this unfortunate impediment, by taking a piece of brass of the length of a metre, and reducing the terminations to a thin edge, which was compared by the committee with the standard metre as usual; when placed on the English scale the extremities of the brass made two parallel lines to those engraved on the scale, and thus the apparatus was capable of being seen through the microscope: by these means the standard metre of platina, and another belonging to the Institute, made of iron, were compared with the English foot; the two measures each being equal, at the temperature of melting ice, to the ten millionth part of the quadrant of the meridian. "At the temperature of 15.3° of the decimal thermometer, or 59.5° of Fahrenheit, the metre of platina was equal to 39.3775 English inches, and that of iron to 39.3788, measured on M. Pictet's scale."

It was discovered, however, that the manner employed produced results not quite satisfactory, as an uncertainty occurred through the difficulty of placing the cross wires exactly at the extreme of the brass plate, where a reflection of light took place which precluded a distinct observation whether the optical axis of the microscope was decidedly a tangent to the surface precisely at the termination. M. Prony, a member of the committee, suggested another arrangement as a remedy for this obstacle, and M. Paul, of Geneva, who was present, carried it into execution: this latter gentleman traced a perpendicular line to its length, on a small metallic ruler, the end of which he placed against a firm resistance, and the cross wires were made to agree with the line; they then interposed the standard metre between the end of the piece and the resisting substance, "and the line traced on it, which had now obviously advanced the length of the metre, was subjected to the other microscope. The microscopes thus fixed were transferred to the graduated scale: one of them was placed exactly over one of the divisions, and the micrometer screw was turned in order to measure the fraction, expressing the distance of the other microscope from another division."

A second comparison took place on the 26th of October, at the residence of a member of the committee; and after several satisfactory experiments, it was discovered, that at the temperature 12.75°, or 55 of Fahrenheit, the standard of platina was 39.3781, and that of iron 39.3795 English inches. The different metres being intended to be equal at the temperature of melting ice, the preceding experiments may be tried by bringing their results to the same temperature. To determine this, we have Borda's accurate trials, and the report of the committee of weights and measures on the dilatation of platina, brass, and iron, whence it appears, "that for each degree of the decimal thermometer, platina expands .00000856; iron, 00001156; and brass, 00001783: for Fahrenheit's scale these quantities become 476; 642, and 990 parts in a hundred millions. From these data we find, that, at the freezing point, the standard metre of platina was equal to 39.38280, and that of iron to 39.38265 English inches of M. Pictet's scale. The difference is less than the 500th of a line, or the 200,000th of the whole metre."

The facts obtained by all the comparisons amount to this conclusion, taking each of the measures at the temperature of melting ice, the individual standard metres are equal to the 10,000,000th part of the quadrant of the meridian, and to 39.38272 English inches of M. Pictet's scale.

MEA'SURELESS. *a.* (from *measure.*) Immense; immeasurable (*Shakspeare*).

MEA'SUREMENT. *s.* (from *measure.*) Mensuration; act of measuring.

MEA'SURER. *s.* One that measures.

MEAT. *s.* (*met*, French.) 1. Flesh to be eaten (*Bacon*). 2. Food in general (*Shaks.*)

ME'ATED. *a.* (from *meat.*) Fed; foddered.

MEATH, or EAST MEATH, a county of Ireland, in the province of Leinster, bounded on the north by the counties of Cavan and Monaghan, on the north-east by Louth, on the east by the Irish sea, on the south-east by Dublin, on the south by Kildare, and on the west by West Meath; thirty miles from north to south, and from twenty-five to thirty-five east to west. It contains 147 parishes, about 22,468 houses, and 112,400 souls. The soil of Meath is various, but generally rich, and a few coarse hills, with very little waste land: the bogs are neither numerous nor extensive; consequently, fuel is scarce and dear. Much coarse linen is made in this county, but its principal sources of wealth are derived from the flocks and herds that are fattened, and the abundance of corn that is raised on its fruitful plains. Trim is the county town. Several small bishoprics were gradually united into one see, and received the name of Meath in the 12th century. There is no cathedral, and the episcopal palace is at a village called Ardbraccan, near the town of Navan.

MEATH (West), a county of Ireland, in the province of Leinster; bounded on the north by Cavan, on the north-east and east by East Meath, on the south by King's county, on the west by Roscommon, from which it is separated by the Shannon, and on the north-west by Longford. It is one of the most populous and fertile counties in Ireland, contains 62 parishes, and sends 10 members to parliament. Mullenger is the county town.

MEATUS AUDITORIUS, the external passage to the drum of the ear. See ANATOMY and EAR.

MEAUX, an ancient town of France, in the

department of Seine and Marne, with a bishop's see. It is large and populous; and the market-place is a peninsula, contiguous to the town, which was formerly well fortified, and, in 1421, stood a siege of three months against the English. It is seated on the Marne, 10 miles N.W. of Colomiers, and 25 N.E. of Paris. Lon. 2. 58 E. Lat. 48. 58 N.

MECAN, a large river, which rises in Thibet, and flowing S.E. through Laos and Cambodia, falls by two mouths into the China sea, forming an island below the city of Cambodia, which here gives name to the eastern branch.

MECÆNAS, or MECŒNAS (C. Cilnius), a celebrated Roman knight, descended from the kings of Etruria. He has rendered himself immortal by his liberal patronage of learned men and of letters; and to his prudence and advice Augustus acknowledged himself indebted for the security he enjoyed. His fondness for pleasure removed him from the reach of ambition; and he preferred dying, as he was born, a Roman knight, to all the honours and dignities which either the friendship of Augustus or his own popularity could heap upon him. To the interference of Mecænas, Virgil owed the retribution of his lands: and Horace was proud to boast that his learned friend had obtained his forgiveness from the emperor for joining the cause of Brutus at the battle of Philippi. Mecænas was himself fond of literature; and, according to the most received opinion, he wrote a history of animals, a journal of the life of Augustus, a treatise on the different natures and kinds of precious stones, besides the two tragedies of Octavia and Prometheus, and other things, all now lost. He died eight years before Christ; and on his death-bed he particularly recommended his poetical friend Horace to the care and confidence of Augustus. Seneca, who has liberally commended the genius and abilities of Mecænas, has not withheld his censure from his dissipation, indolence, and effeminate luxury. From the patronage and encouragement which the princes of heroic and lyric poetry among the Latins received from the favourite of Augustus, all patrons of literature have ever since been called Mecænates. Virgil dedicated to him his Georgics, and Horace his Odes.

MECCA, an ancient and famous town of Arabia Deserta, seated in a barren valley, surrounded by many little hills, consisting of a blackish rock. The buildings are very mean, and its support is the annual resort of pilgrims at a certain season of the year; for, at other times, the shops are scarcely open. On the top of one of the hills is a cave, where they pretend Mahomet usually retired to perform his devotions; and hither, they affirm, the greatest part of the Koran was brought him by the angel Gabriel. The town has plenty of water, and yet little garden-stuff; but there are several sorts of good fruit, as grapes, melons, watermelons, and cucumbers. Numbers of sheep are brought hither to be sold to the pilgrims. The temple of Mecca has 42 doors, and its form resembles the Royal Exchange in London, but it is near ten times as large. It is open in the middle, and the ground covered with gravel, except in two or three places that lead to the Beat-Allah through certain doors; and these are paved with short stones. There are cloisters all round, and in the sides are cells for those that live a monastic life. The Beat-Allah, in the middle of the temple, is a square structure, each side about 20 paces long, and 24 feet high; covered all over from top to bottom with a thick sort of silk, and the middle embroidered with large letters of gold: the door is covered with silver plates, and has a curtain before it, thick with gold embroidery. This Beat is the principal object of the pilgrims devotion, and is open but two days in the space of six weeks, one day for the men, and the next for the women. Within there are only two wooden pillars in the middle to support the roof, with a bar of iron fastened thereto, on which hang three or four silver lamps: the walls are marble, and covered with silk, unless when the pilgrims enter. About 12 paces from the Beat is the sepulchre of Abraham, as they pretend; and they affirm that he erected the Beat-Allah. When the pilgrims have performed their devotions here, they repair to a hill, which, however, is not large enough to contain them all at once, for there are no less than 70,000 pilgrims every year. When certain ceremonies are over, they receive the title of hadgies or saints; and the next morning they move to a place about two miles from Mecca, where they say Abraham went to offer up his son Isaac. Here they pitch their tents, and then throw seven small stones against a little square stone building. This, they affirm, is performed in defiance of the devil. Every one that purchases a sheep, eating some of it themselves, and giving the rest to poor people who attend upon that occasion. Mecca is 34 miles N.E. of Judda, the seaport of Mecca, and 220 S. by E. of Medina. Lon. 40. 55 E. Lat. 21. 45 N.

MECHADEB, a town of Arabia Felix, in the province of Yemen, 72 miles S. of Sanaa. Lon. 44. 15 E. Lat. 14. 7 N.

MECHANICAL, an epithet applied to whatever relates to mechanics; thus we say mechanical powers, causes, &c. See the articles POWER, CAUSE, &c. The mechanical philosophy is the same with what is otherwise called corpuscular philosophy. See CORPUSCULAR. This manner of reasoning, formerly much used in medicine is described by Dr. Quincy as the result of a thorough acquaintance with the structure of animal bodies: for, considering an animal body as a composition out of the same matter from which all other bodies are formed, and to have all those properties which concern a physician's regard, only by virtue of its peculiar construction; it naturally leads a person to consider the several parts, according to their figures, contexture, and use, either as wheels, pulleys, wedges, levers, screws, cords, canals, strainers, &c. For which purpose, continues he, it is frequently found help-

-ful to design in diagrams, whatsoever of that kind is under consideration, as is customary in geometrical demonstrations.

Mechanical, in mathematics, denotes a construction of some problem as the duplicature of the cube and quadrature of the circle, by the assistance of instruments, in contradistinction to that which is done in an accurate and geometrical manner.

Mechanical curve, is a curve, according to Descartes, which cannot be defined by any algebraic equation; and so stands contradistinguished from algebraic or geometrical curves. Leibnitz and others call these mechanical curves transcendental, and dissent from Descartes, in excluding them out of geometry. Leibnitz found a new kind of transcendental equations, whereby these curves are defined: but they do not continue constantly the same in all points of the curve, as algebraic ones do. See the article Transcendental.

MECHANICS, that branch of practical mathematics which considers motion and moving powers, their nature and laws, with their effects in machines.

The term mechanics is equally applied to the doctrine of the equilibrium of powers, more properly called statics; and to that science which treats of the generation and communication of motion, which constitutes dynamics, or mechanics strictly so called. See Statics, Power, Motion, Dynamics, &c.

The knowledge of mechanics is one of those things, says Mr. Mac Laurin, that serve to distinguish civilized nations from barbarians. It is by this science that the utmost improvement is made of every power and force in nature; and the motions of the elements, water, air, and fire, are made subservient to the various purposes of life; for however, weak the force of man appears to be, when unassisted by this art; yet, with its aid, there is hardly any thing above his reach. It is distinguished by sir Isaac Newton into practical and rational mechanics; the former of which treats of the mechanical powers, viz. the lever, balance, axis and wheel, pulley, wedge, screw, and inclined plane.

Rational mechanics comprehends the whole theory of motion, shews when the powers or forces are given how to determine the motions that are produced by them; and conversely when the phænomena of the motions are given, how to trace the powers or forces from which they arise.

The Greeks, from whom we have borrowed the term, gave it a much more limited meaning; confining it to those motions which are produced by the intervention of machines. Even many of the naturalists of the present day limit the term to those motions which are the immediate consequences of impulse, and which are cases of sensible motion. Thus the chemist says, that printers ink is a mechanical fluid, but that ink for writing is a chemical fluid. We make no objection to the distinction, because chemistry is really a vast body of real and important science, although we have, as yet, been able to class only very complicated phenomena, and are far from the knowledge of its elements. This distinction made by the chemists is very clear, and very proper to be kept in view; but we should be at a loss for a term to express the analogy which is perceivable between these sensible motions and the hidden motions which obtain even in the chemical phenomena, unless we give mechanism a still greater extension than the effects of percussion or impulsion.

Mechanics, in the ancient sense of the word, considers only the energy of *organa*, machines. The authors who have treated the subject systematically have observed, that all machines derive their efficacy from a few simple forms and dispositions, which may be given to that piece of matter called the *tool*, 'Οργανον, or *machine*, which is interposed between the workman or natural agent, and the task to be performed, which is always something to be moved, in opposition to resisting pressures. To those simple forms they have given the name of mechanical powers, simple powers, simple machines.

The machine is interposed for various reasons.

1. In order to enable a natural power, having a certain determinate intensity, which cannot be increased, to balance or overcome another natural power, acting with a greater intensity. For this purpose, a piece of solid matter is interposed, connected in such a manner with firm supports, that the pressure exerted on the impelled point by the power occasions the excitement of a pressure at the working point, which is equal or superior to the resistance, arising from the work, to the motion of that point. Thus, if a rod three feet long be supported at one foot from the end to which the resistance of two pounds is applied, and if a pressure of one pound be applied to the other end of the rod, perpendicular to its length, the cohesive forces which connect the particles of the rod will all be excited, in certain proportions, according to their situation, and the supported point will be made to press on its support as much as three pounds would press on it; and a pressure in the opposite direction will be excited at the working point, equal to the pressure of two pounds. The resistance will therefore be balanced, and it will be overcome by increasing the natural power acting on the long division of the rod. This is called a lever. Toothed wheels and pinions are a perpetual succession of levers in one machine or mechanical power.

Many of the instruments in common use are levers of one of the three kinds; thus, pincers, sheers, forceps, snuffers, and such like, are compounded of two levers of the first kind; for the joint about which they move is the fulcrum, or centre of motion; the power is applied to the handles, to press them together; and the weight is the body which they pinch or cut. The cutting knives used by druggists, pattenmakers, block-makers, and some other trades, are levers of the 2d kind: for the knife is fixed by a ring at one end, which makes the fulcrum,

or fixed point; the other end is moved by the hand, or power; and the body to be cut, or the resistance to be overcome, is the weight. Doors are levers of the 2d kind; the hinges being the centre of motion; the hand applied to the lock is the power; while the door or weight lies between them. A pair of bellows consists of two levers of the 2d kind; the centre of motion is where the ends of the boards are fixed near the pipe; the power is applied at the handles; and the air pressed out from between the boards, by its resistance, acts against the middle of the boards like a weight. The oars of a boat are levers of the 2d kind: the fixed point is the blade of the oar in the water; the power is the hand acting at the other end; and the weight to be moved is the boat. And the same of the rudder of a vessel. Spring sheers and tongs are levers of the 3d kind; where the centre of the motion is at the bow-spring at one end; the weight or resistance is acted on by the other end; and the hand or power is applied between the ends. A ladder reared by a man against a wall, is a lever of the 3d kind: and so are also almost all the bones and muscles of animals.

In all levers, the effect of any power or weight, is both proportional to that power or weight, and also to its distance from the centre of motion. And hence it is that, in raising great weights by a lever, we choose the longest levers; and also rest it upon a point as far from the hand or power, and as near to the weight, as possible. Hence also there will be an equilibrium between the power and weight, when those two products are equal, viz. the power multiplied by its distance, equal to the weight multiplied by its distance; when, also, the weight and power are to each other reciprocally as their distances from the prop or fixed point.

2. The natural power may act with a certain velocity which cannot be changed, and the work requires to be performed with a greater velocity. A machine is interposed, moveable round a fixed support, and the distances of the impelled and working points are taken in the proportion of the two velocities. Then are we certain, that when the power acts with its natural velocity, the working point is moving with the velocity we desire.

3. The power may act only in one unchangeable direction, and the resistance must be overcome in another direction. As when a quantity of coals must be brought from the bottom of a pit, and we have no power at command but the weight of a quantity of water. We let the water pull down one end of a lever, either immediately or by a rope, and we hang the coals on the other end, while the middle point is firmly supported. This lever may be made perpetual, by wrapping the ropes round a cylinder which turns round an axis firmly supported. This is a fixed pulley. We can set unequal powers in opposition, by lapping each rope round a different cylinder, having the same axis. This is a windlass or gin. All these forms derive their energy from the lever virtually contained in them.

Thus, in the axis-in-peritrochio, the centre of the axis, or wheel, is the fixed point; the radius of the wheel is the distance of the power acting at the circumference of the wheel, from that point; and the radius of the axle is the distance of the weight from the same point. Hence the effect of the power, independent of its own natural intensity, is as the radius of the wheel; and the effect of the weight is as the radius of the axle; so that the two will be in equilibrio, when the two products are equal, which are made by multiplying each of these, the weight and power, by the radius, or distance at which it acts; and then also, the weight and power are reciprocally proportional to those radii.

In practice, the thickness of the rope, that winds upon the axle, and to which the weight is fastened, is to be considered: which is done, by adding half its thickness to the radius of the axis, for its distance from the fixed point, when there is only one fold of rope upon the axle; or as many times the thickness as there are folds, wanting only one half when there are several folds of the rope, one over another: which is the reason that more power must be applied when the axis is thus thickened; as often happens in drawing water from a deep and narrow well, over which a long axle cannot be placed.

If the rope to which the power is fastened be successively applied to different wheels, whose diameters are larger and larger; the axis will be turned with still more and more ease, unless the intensity of the power be diminished in the same proportion; and if so, the axis will always be drawn with the same strength by a power continually diminishing. This is practised in spring clocks and watches; where the spiral spring, which is strongest in its action when first wound up, draws the fuzee, or continued axis-in-peritrochio, first by the smaller wheels, and as it unbends and becomes weak, draws at the larger wheels, in such manner that the watch work is always carried round with the same force.

Any of the three purposes above-mentioned may be gained by the interposition of a solid body in another way. Instead of being supported in one point, round which it is moveable, it may be supported by a solid path, along which it is impelled, and by its shape it thrusts the resisting body out of its way. This is the case with the wedge when it is employed to force up a swagging joist, or press things strongly together. If this wedge be wrapped or formed round an axis, it becomes a screw or a spiral wiper. This is also the operation of the balance wheel of a horizontal or cylinder watch. The oblique face of the tooth is a wedge, which thrusts the edge of the cylinder out of its way. The pallet of a clock or watch is also a wedge, acted on in the opposite direction.

These are the different forms in which a solid body is interposed as a mechanic power. All are reducible to the lever and the wedge.

In the screw, and the wedge, the power has to overcome both the weight, and also a very great friction in those machines; such indeed as amounts sometimes to as much as the weight

to be raised, or more. But then this friction is of use in retaining the weight and machine in its place, even after the power is taken off.

There are other mechanic powers besides those now mentioned. The carmen have a way of lowering a cask of liquor into a cellar, by passing a rope under it, making the end fast to some stake close to the ground, and bringing the other end of the rope round the cask, and thus letting it slip down in the bight of the rope. In this process they feel but half of its weight, the other half being supported by the end of the rope that is fastened to the stake. This is called a parbuckle by the seamen. A hanging pulley is quite the same with this more artless method. The weight hangs by the axis of the pulley, and each half of the hanging rope carries half of the weight, and the person who pulls one of them upwards acts only against half of the weight, the other being carried by the hook to which the standing rope is fastened. This mechanical power does not (as is commonly imagined) derive its efficacy from the pulley's turning round an axis. If it were made fast, or if the tackle rope merely passed through a loop of the rope which carries the weight, it would still require only half of the weight acting on the running rope to balance it. The use of the motion round an axis is merely to avoid a very great friction. When the two hanging parts of the rope are not parallel, but inclined in any angle, the force necessary for balancing the weight is to the weight as the side is to the diagonal of the parallelogram formed by the directions of the three ropes. Varignon calls this the funicular machine or power. Our sailors call it the swigg.

We may employ the *quaqua versum* pressure of fluidity with great effect as a mechanic power. Thus, in the hydrostatic bellows described by Gravesande, § 1451, and by Desaguiers, the weight of a few ounces of water is made to raise several hundred pounds. In like manner, Dr. Wallis of Oxford, by blowing with a pipe into a bladder, raised 64 pounds lying on it. Otto Guericke of Magdeburgh made a child balance, and even overcome, the pull exerted by the emperor's six coach horses, by merely sucking the air from below a piston. Mr. Bramah, ironmonger in Piccadilly, London, has lately obtained a patent for a machine acting on this principle as a press. A piston of one-fourth of an inch in diameter forces water into a cylinder of 12 inches diameter, and by this intervention raises the piston of the cylinder. A boy, acting with the fourth part of his strength on the small piston by means of a lever, raises 42 tons, or 94,080 libs, pressing on the great piston. It is very surprising, that this application of the *quaqua versum* pressure of fluids has been overlooked for more than a century, although the princ'ple has been inculcated and lectured on by every itinerant teacher, and illustrated by the above-mentioned experiments of Gravesande and Wallis.

Some of the principles of statics were established by Archimedes, in his treatise on the Centre of Gravity of Plane Figures: besides which, little more upon mechanics is to be found in the writings of the ancients, except what is contained in the 8th book of Pappus's Mathematical Collections, concerning the five mechanical powers. Galileo laid the best foundation of mechanics, when he investigated the descent of heavy bodies; and since his time, by the assistance of the new methods of computation, a great progress has been made, especially by Newton, in his Principia, which is a general treatise on Rational and Physical Mechanics, in its largest extent. Other writers on this science, or some branch of it, are, Guido Ubaldus, in his Liber Mechanicorum Torricelli, Libri de Motu Gravium naturaliter Descendentium et Projectorum; Balianus, Tractatus de Motu naturali Gravium; Huygens, Horologium Oscillatorium, and Tractatus de Motu Corporum ex Percussione; Leibnitz, Resistentia Solidorum in Acta Eruditor, an. 1684; Guldinus, De Centro Gravitatis; Wallis, Tractatus de Mechanica; Varignon, Projet d'une Nouvelle Mechanique, and his papers in the Memoir. Acad. an. 1702; Borelli, Tractatus De Vi Percussionis, De Motionibus Naturalibus a Gravitate pendentibus, and De Motu Animalium; De Chales, treatise on Motion; Pardies, Discourse of Local Motion: Parent, Elements of Mechanics and Physics; Casatus, Mechanica; Oughtred, Mechanical Institutions; Rohault, Tractatus de Mechanica; Lamy, Mechanique; Keill, Introduction to true Philosophy; De la Hire, Mechanique; Mariotte, Traité du Choc des Corps; Ditton, Laws of Motion; Herman, Phoronomia: Gravesande, Physics; Euler, Tractatus de Motu; Musschenbroek, Physics; Bossu, Mechanique; Desaguliers, Mechanics; Rowning, Natural Philosophy; Emerson, Mechanics; Parkinson, Mechanics; La Grange, Mechanique Analytique; Nicholson, Introduction to Natural Philosophy; Enfield, Institutes of Natural Philosophy; Wood, Mechanics; Atwood, on Motion; Gregory, Mechanics in Theory and Practice; Francœur, Mecanique; Prony, Architecture Hydraulique, and Mecanique Analitique; and lastly, a very neat Introduction to the Theory of Mechanics, just published by Mr. Marat of Boston. As to the description of machines, see Strada, Zeisingius, Besson, Augustine de Ramellis, Boetler, Leopold, Sturmy, Perrault, Limberg, Emerson, Royal Academy of Sciences, Prony, Bailey, Brewster, Gregory, Transactions, Society of Arts, Repertory of Arts, &c.

MECHA'NICALLY. *ad.* (from *mechanic.*) According to the laws of mechanism (*Ray*).

MECHA'NICALNESS. *s.* (from *mechanic.*) 1. Agreeableness to the laws of mechanism. 2. Meanness.

MECHANI'CIAN. *s.* (*mechanicien*, Fr.) A man professing or studying the construction of machines (*Boyle*).

ME'CHANISM. *s.* (*mechanisme*, French.) 1. Action according to mechanick laws (*Arb.*). 2. Conctruction of parts depending on each other in any complicated fabrick.

MECKLENBURG, a country of Germany,

in the circle of Lower Saxony; bounded on the N. by the Baltic, on the E. by Pomerania, on the S. by Brandenburg, and on the W. by Holstein and Lunenburg. It extends 135 miles in length, and 90 where broadest, and abounds in corn, pastures, and game. This country was, for many centuries, under the government of one prince: but on the death of the sovereign in 1592, it was divided between his two sons; the eldest retaining the duchy of Mecklenburg and Schwerin, which is considerably the largest share, and the younger obtained the duchy of Mecklenburg Strelitz. Schwerin is the capital of the former, and New Strelitz of the latter.

MECKLEY, a province of Asia, bounded on the N. by Assam, on the E. by China, on the W. by Bengal, and on the S. by Roshaan and Burmah, to which last it is subject.

MECHLIN, a city of the Austrian Netherlands, capital of a district of the same name, with an archbishop's see. It consists of several small islands made by artificial canals, over which are a great many bridges; and its cathedral is a superb structure, with a very high steeple. Here is a great foundery for ordnance of all kinds; and it is famous for fine lace, and a sort of beer, which is sent into the neigbouring provinces. The territory of this town is a lordship, which comprehends two small districts containing nine towns of little consequence, and some villages. It submitted to the duke of Marlborough in 1706, and was taken by the French in 1746, but restored in 1748. In 1792, the French again took it, evacuated it the next year, and re-entered it in 1794. It is seated on the Dender, 10 miles N.E. of Brussels, and 15 S.E. of Antwerp. Lon. 4. 34 E. Lat. 51. 2 N.

MECHOACHAN, a province of New Spain, in the audience of Mexico; bounded on the N.W. by New Biscay, on the N.E. by Panuco, on the E. by Mexico Proper, on the S. by the Pacific ocean, and on the W. by New Galicia. It is 200 miles in circumference, and is very rich, abounding in all the necessaries of life. It has also mines of silver and copper, great plenty of cocoa-nuts, and much silk.

MECHOACHAN, or VALLADOLID, a considerable town of New Spain, capital of the province of Mechoachan, with a bishop's see. It is seated near a great lake, 110 miles W. of Mexico. Lon. 102. 28 W. Lat. 20. 5 N.

MECHOACHAN, in the materia medica, the root of an American species of convolvulus. See CONVOLVULUS.

MECONIUM, Μηκωνιον, from μηκων, *poppy*, in pharmacy, is the juice of the poppy, drawn by incision, and dried.

Meconium differs from opium, in that this first ouses out spontaneously, after an incision made in the heads of the poppies, whereas the other is drawn by violence, both from the heads and leaves, and even from the whole plant, bruised and pressed together. Meconium has all the virtues of foreign opium, but in a lower degree.

MECONIUM is also a black thick excrement, gathered in the intestines of a child during the time of gestation.

In colour and consistence it resembles pulp of cassia. It is also thought to resemble meconium, or juice of poppy; whence it takes its name. See INFANCY and MIDWIFERY.

MECRAN, a province of Persia, bounded on the N. by Segestan and Candahar, on the E. by Hindoostan, on the S. by the Indian ocean, and on the W. by Kerman. The southern part is dry, and little more than a desert; the northern is less so; but animals are rare, and the soil far from fertile.

MECRINHOS, a town of Portugal, in Tra los Montes, 15 miles N.N.E. of Torre de Moncove, and 24 S.E. of Mirandela. Lon. 6. 3 W. Lat. 41. 8 N.

MEDAL, a piece of metal in form of a coin, such as was either current money among the ancients, or struck on any particular occasion, in order to preserve to posterity the portrait of some great person, or the memory of some illustrious action. Scaliger derives the word medal from the Arabic *methalia*; a sort of coin with a human head upon it. But the opinion of Vossius is generally received; viz. that it comes from *metallum*, metal; of which substance medals are commonly made.

I. *Utility of Medals in History, and various other Sciences.*

There are few studies of more importance to history than that of medals; the sole evidence we can have of the veracity of an historian being only such collateral documents as are evident to every body, and cannot be falsified. In modern times, these are found in public memoirs, instructions to ambassadors, and state papers of various kinds. Such memorials, however, are subject to various accidents, and besides commonly remain in the countries where they are first published, and cannot therefore give to the world at large that perfect and entire satisfaction which ought to be derived from genuine history; so that more durable and widely diffused monuments are still to be wished for. Such are public buildings, inscriptions, and statues; but these, excepting a few instances of the two last, are always confined to particular countries; so that medals alone remain as infallible documents of truth, capable of being diffused over all countries in the world, and of remaining through the latest ages.

The study of the Greek coins does not show the dates of events, though it illustrates the chronology of reigns. This defect, however, is abundantly supplied by those of Rome, which commonly mark the date of the prince's consulship, the year of his tribunician power; giving also, upon the reverse, the representation or poetical symbol of some grand event.

Medals afford the most authentic documents of the Roman history, in particular, that could have been invented by man. The histories of Nerva and Trajan are much better elucidated by medals than by authors; for the history of Suetonius ends with Domitian, and the Historiæ Augustæ Scriptores begins with Adrian: so that the reigns of the two emperors just mentioned are almost unknown; and Mr. Pinkerton is surprised that none of the learned have attempted to supply the defect. —"Capitolinus (says he), in his life of Maximinus junior, is quite puzzled to know if Maximus and

Pupienus were two emperors, or two names for the same. Had he happened on any of those coins which bear M. CL. PUPIENUS MAXIMUS AUG. he would have seen at once that Maximus was only another name for Pupienus."

Medals are useful in other sciences besides history. In geography, we find the situation of towns determined by their vicinity to some noted river, mountain, &c. Thus, ΜΑΓΝΗΤΩΝ ΣΙΠΥΛΟΥ shows that Magnesia was situated under Mount Sipylus. In like manner, it is shown from a medal, that Ephesus stood on the river Cayster; and there is extant a medal, bearing an inscription, which signifies Alexandria on the Scamander, a name given to Troy by Alexander the Great. The reverse has upon it the famous Apollo Smintheus of Homer. In natural history, also, medals are useful chiefly from the coins struck on the celebration of the secular games, in which the figures of various animals are preserved; and thus it may very often be determined whether any animal be known to the ancients or not. On many of the Greek medals are several uncommon plants and animals. Thus, on most of the medals of Cyrene is the figure of the celebrated Sylphium; and on those of Tyre, the shell-fish from which the famous Tyrian purple was procured. By means of medals, also, the exact delineations of many noble edifices are preserved, though not even a vestige of their ruins be now existing; so that the uses of them to the architect are very considerable. To the connoisseur they are absolutely necessary; because by them alone he is enabled to ascribe ancient busts and statues to their proper persons, with multitudes of other points of knowledge which cannot be otherwise determined. The elucidations of obscure passages in ancient authors by means of medals are so numerous and well known, that it is needless to insist upon them.

Mr. Addison has treated the connection betwixt medals and poetry at considerable length; but Mr. Pinkerton finds fault with him for preferring the Latin to the Greek poets. He observes, also, that the knowledge of Greek medals is most necessary for a sculptor, and perhaps an architect; but an acquaintance with Latin ones is preferable for a poet, or perhaps a painter. The reason of this difference is, that the former generally have on the obverse the head of some king, god, or goddess, of exquisite relief and workmanship; but the reverse seldom affords much fancy of symbol in the early Greek coins; and in the imperial Greek coins, is chiefly impressed with the temples of their deities. To a person of poetical imagination, however, the Roman coins afford the greatest entertainment, from the fine personifications and symbols to be found on their reverses; of which our author gives many instances.

As the reverses of medals are so useful for knowledge of personification, symbols of countries and actions, and the like, so the portraits to be seen on old coins are no less important to a painter; the high merit of a great number of them, in every character, justly intitling them to be regarded as the best studies in the world. Not to mention, that, to an historic painter, the science of ancient medals is absolutely necessary, that he may delineate his personages with the features they really bore while in existence. This can only be attained in this way, or from statues and busts; any one of which will cost as much as hundreds of medals; and indeed a collection of such is only attainable by princes.

The same things which render the study of medals important to a painter, do still more so to a sculptor; and in this particular, the study of the Greek coins is remarkably useful. The skill of the Greeks in the art of sculpture has always been admired throughout the world: and on their coins the heads of several deities are represented in the most exquisite *alto-relievo*. Our author therefore thinks it strange, that the Grecian coins should have hitherto been so little attended to by men of learning and taste. They may have been looked upon, he supposes, as belonging only to the province of the antiquary; but he assures us, that the Greek medals will afford satisfaction to the persons who value them only as pieces of workmanship. In most respects, they greatly excel those of Rome even in its best times; which our author supposes to have been from the days of Augustus to Adrian. "In the days of Adrian, in particular (says he), the Roman mint seems to have been the very seat of art and genius; witness the vast number of exquisite personifications, engraven with equal workmanship, which swarm on the medals of that prince. Yet from his time down to Posthumus, coins of admirable workmanship are to be found. Those of the Faustinas and Lucilla deserve particular mention. There is one, and not an uncommon one, of the latter in great brass, which yields to nothing of the kind. The reverse is a Venus with the name around her. The portrait of the obverse seems to spring from the field of the coin; it looks and breathes, nay talks, if you trust your eyes. The coins of Tarsus are extremely remarkable for a kind of perspective in the figures, as Froelich observes. On others are found triumphal arches, temples, fountains, aqueducts, amphitheatres, circi, hippodromes, palaces, basilicas, columns and obelisks, baths, sea ports, pharoses, and the like. These furnish much pleasure and instruction to the architect, and serve to form his taste to the ancient manner; that manner which unites perfect simplicity with sublimity and grace; that manner which every age admires, in proportion as it has genius to imitate."

II. *History of Medals.*

The study of medals is not of very ancient date: none of the classic writers give any account of collections of them; though indeed many little particulars are passed without notice by them. In the times of the Greeks, a collection of such coins as then existed must have been but little regarded, as consisting only of those struck by the numerous little states which at that time used the Greek characters and language. Hence they would have had an air of domestic coinage, and no attention would have been paid to them, however exquisite their workmanship might have been. The little intercourse at that time carried on betwixt the different provinces also, greatly impeded any communication of knowledge to those who wrote histories; so that it is no wonder to find any small collections that might then have existed altogether unnoticed by them.

Almost as soon as any communication was opened between the Greeks and Romans, the latter treated the arts of the Greeks with all due respect and applause. Their coins were imitated by the Romans, and preserved in cabinets by the senators among their choicest treasures. Suetonius informs us, that on solemn occasions Augustus was accustomed to present his friends with medals of foreign states and princes, along with other va-

luable testimonies of his friendship. In a more advanced period of the Roman empire, however, individuals would undoubtedly form collections of coins peculiar to their own state; for Dr. Stukely, in his Medallic History of Carausius, informs us, that a complete series of silver coins was lately found in Britain, containing all the emperors down to Carausius inclusively. From Banduri we also know, that certain Greek coins were specially preserved by the Romans; and it appears from their code, that ancient gold and silver coins were made use of instead of gems; to which distinction those of Sicily were particularly intitled. From the decline of the Roman empire till towards the end of the 5th century, almost all branches of literature were involved in darkness, and the medallic science among the rest. While the Christian dominion of Constantinople lasted, indeed almost all the arts and sciences may be said to have been kept within its own boundaries; though the Arabs and eastern nations had some arts and sciences of their own: but after the destruction of the imperial city by the Turks, the Greeks were once more compelled to become fathers to the European science. Even before this time, indeed, some vestiges of a revival of literature had appeared in Italy; "and so intimate and necessary a connection (says Mr. Pinkerton) has now the study of medals with that of ancient erudition, that, on the earliest appearance of a revival of the latter, the former was also disclosed."

The first among the moderns who began to study the medallic science was Petrarch. Being desired by the emperor Charles IV. to compose a book containing the lives of eminent men, and to place him in the list, he replied, that he would do so whenever the emperor's life and conduct deserved it. In consequence of this conversation he afterwards sent the emperor a collection of gold and silver coins bearing the representations of eminent men, with an address suitable to his former declaration. A collection of coins was made in the next age by Alphonso king of Arragon; but though this monarch collected all that could be found throughout Italy, we know that there could not have been very many, as the whole were contained in an ivory cabinet, and carried always about with him. A very considerable collection was made by Anthony Cardinal St. Mark, nephew to Eugene IV. who ascended the pontifical chair in 1431; and soon after the grand museum at Florence was begun by Cosmo de Medici, where a collection of ancient coins and medals had a place among other curiosities. Corvinus king of Hungary about the same time formed a noble collection of coins along with ancient manuscripts and other valuable relics of antiquity.

Mr. Pinkerton considers Agnolo Poliziano, more commonly known by the name of Angelus Politianus, as the first writer who adduced medals as vouchers of ancient orthography and customs. He cites different coins of the Medicean collection in his Miscellanea written about the year 1490. By means of a cabinet of medals collected by Maximilian I. emperor of Germany, Joannes Huttichius was enabled to publish a book of the lives of the emperors, enriched with their portraits, delineated from ancient coins. It is generally supposed that this book, which appeared in 1525, was the first work of the kind; but Labbe, in his Bibliotheca Nummaria, mentions another named Illustrium Imagines, by one Andreas Fulvius, printed in 1517, in which most of the portraits seem to be from medals. About the year 1512 also, Guillaume Bude, a French author, had written his treatise De Asse, though it was not printed till many years afterwards. M. Grollier, treasurer of the French armies in Italy, during part of the 16th century, had a great collection of coins of different kinds of metals. After his death, his brass medals were sent to Provence, and were about to be sent into Italy; when the king of France, having got information of the transaction, gave orders to stop them, and purchase the whole at a very high price for his own cabinet of antiquities. M. Grollier had an assortment of gold and silver as well as of brass medals: the cabinet in which they were contained fell two centuries afterwards into the hands of M. L'Abbe de Bothelin, and was known to have been that of Grollier, from some slips of paper, on which was his usual inscription for his books, Joannis Grollierii et amicorum.

Cotemporary with Grollier was Guillaume de Choul, who was likewise a man of rank and fortune. He had a good collection of medals, and published many in his Treatise on the Religion of the ancient Romans in 1557. In the low countries we know, from the letters of Erasmus, that the study of medals was begun about the beginning of the 16th century. About the middle of that century, Hubertzus Goltzius, a printer and engraver, travelled over most countries in Europe searching for coins and medals, in order to publish books concerning them. From one of these works it appears, that there were then in the low countries 200 cabinets of medals, 175 in Germany, upwards of 380 in Italy, and 200 in France. It is probable, however, that there are now four times as many in these countries, besides 500 in Britain; but we are not to imagine that all these were grand collections, for of such there are not above a dozen even in Italy: most of those just mentioned were of the class named caskets of medals, containing from 100 to 1000 or 2000.

There are few countries, Italy excepted, in which a greater number of coins have been found than in Britain; though we are by no means well acquainted with the time when the study of them commenced. Mr. Pinkerton suspects that Camden was one of the first, if not the very first, British author who produced medals in his works, and who must have had a small collection. Speed's Chronicle, published in the 17th century, was illustrated with coins from sir Robert Cotton's cabinet. Gordæus's collection was purchased by Henry prince of Wales, brother to Charles I. to whom he left it at his death. According to Joseph Scaliger, it consisted of 30,000 coins and medals. A collection of 5500 coins was purchased by archbishop Laud for 600l. and given to the Bodleian library. Thomas earl of Arundel, earl-marshal of England, well known from the Arundelian tables and other antiquities which he imported from Greece and Italy into Britain, had a rich cabinet of medals collected by Daniel Nisum. The dukes of Buckingham and Hamilton, sir William Paston, sir Thomas Faushaw of Ware-Park, sir Thomas Hanmer, Ralph Sheldon, esq. Mr. Selden, &c. are enumerated by Evelyn as collectors of medals. Charles I. as well as his historian the earl of Clarendon, were also collectors. The king had a very fine cabinet; which, however, were dissipated and lost during the civil commotions. Oliver Cromwell had a small collection; and the cabinet of Charles II. is mentioned by Vaillant in the preface to his treatise entitled Nummi in Coloniis, &c. This branch of magnificence has not been much

attended to by succeeding British monarchs; though his present majesty has a very good collection of ancient gold coins.

A great number of fine cabinets have been formed in Britain since the time of Evelyn. About the year 1720 Haym makes mention of those of the duke of Devonshire, the earls of Pembroke and Winchelsea, sir Hans Sloane, sir Andrew Fontaine, Mr. Sadler, Mr. Abdy, Mr. Wren, Mr. Chicheley, and Mr. Kemp. At present there are many remarkable collections; but that of the late Dr. Hunter was deservedly esteemed the most remarkable in Europe, excepting that of the late French king. It was not only formed at a great expence, but with much care and ability; many foreign medals offered to it having been rejected. The other remarkable collections are these of the duke of Devonshire, the earl of Pembroke, earl Fitzwilliam, formerly the marquis of Rockingham's, the honourable Horace Walpole, the reverend Mr. Crachrode, the reverend Mr. Southgate, Mr. Townley, Mr. R. P. Knight, Mr. Edward Knight, Mr. Tyson, Mr. Barker, Mr. Brown, and several others. The museum and universities have also collections; as well as the lawyers library, and the colleges in Scotland.

III. *Materials of which Medals are constructed.*

Medals are formed of gold, silver, and the various modifications of copper. The gold usually made use of in coinage is about the fineness of 22 carats; and as the art of purifying this metal was very much unknown in former times, the most ancient medals are for this reason much more impure than the modern coins. Gold is never found in its native state above 22 carats fine; and the very ancient medals are much under that standard. Many of them are composed of a mixture of gold and silver, called by the ancients electrum. The gold medals were made of much finer metal after Philip of Macedon became possessed of the gold mines of Philippi in Thrace, and the medals of his son Alexander the Great are equally fine; as well as those of some other princes of that age. Those of the Egyptian Ptolemies are of the fineness of 23 carats three grains, with only one grain of alloy. The Roman coins are very pure, even from the earliest times; the art of refining gold being well known before any was coined at Rome. Some authors are of opinion, that the Roman coins begin to fall short of their purity after the time of Titus; but Mr. Pinkerton denies that any thing of this kind takes place till the time of the emperor Severus; and even then only in a very few instances. Most of the Roman gold was brought from Dalmatia and Dacia, where that metal is still to be met with. A very remarkable circumstance is observed in the eastern part of Hungary, which belonged to the ancient Dacia: it germinates in the vines of Tokay, and is found in their stems; as it is elsewhere in the straw of corn.

Pliny informs us, and indeed it is generally known, that gold and silver are found mixed together in the earth. When the silver amounted to one-fifth part of the gold, the metal was called electrum; but sometimes the quantity of silver was added artificially. The gold was in those days, as well as at present, refined by means of mercury: and the ancient artists had certainly attained to great perfection in this branch of metallurgy; as Bodin tells us, that the goldsmiths of Paris, upon melting one of Vespasian's gold coins, found only $\frac{1}{788}$th part of alloy.

Most of the ancient silver, particularly that of Greece, is less pure than that of succeeding times; even the Roman silver is rather inferior to the present standard, and that from the very beginning; but in the time of Severus, the silver appears very bad, and continues so until the time of Dioclesian. Many writers upon this subject have mistaken the *denarii ærei*, coins of brass washed with silver, for silver currency. Silver coins are extremely scarce from the time of Claudius Gothicus to that of Dioclesian, or from the year 270 to 284; in which short space no fewer than eight emperors reigned. Silver at that time was found mostly in Spain; and the commerce with that country was disturbed by the usurpers who arose in Gaul: and such were the troubles of the times, that not only the silver, but also the gold coins of those eight emperors, are extremely scarce. There is still, however, some silver extant of these eight emperors; and it is certain, that copper washed was never used as silver currency, but was entirely a distinct coinage. Occasional depravations of silver had taken place long before; as Pliny tells us, that Mark Antony mixed iron with his silver denarii; and Mr. Pinkerton informs us, that he had seen a denarius of Antony, which was attracted by a magnet.

The ancient brass coins consist of two kinds; the red or Cyprian, which indeed is no other than copper; and the common yellow brass. Our author observes, that in the Roman coinage, brass was of double the value of copper, and he is of opinion that it was the same among the Greeks; and the latter is the metal most commonly made use of in the Greek coinage. The Roman sestertii are always of brass: the middling sized kind are partly copper and partly brass; the former being double the value of the latter, which are the ases.

Mr. Pinkerton next proceeds to give an account of the mixed metals used among the Romans. In Britain all kinds of coins made of mixed metal are without hesitation alleged to be forgeries; although it is certain that the variety of mixed metals used in coinage was very considerable. The most valuable mixture was that of gold or silver already mentioned, named electrum; the silver commonly amounting to one-fifth part of the gold made use of, or perhaps more. Of this mixture are many of the early coins of Lydia, and some other Asiatic states; also those of the kings of the Bosphorus Cimmerius, during the imperial ages of Rome. Next to the electrum were the coins of Corinthian brass: but Mr. Pinkerton informs us, that not a single coin was ever struck of this metal by the ancients; it having been constantly employed only in the fabrication of vases or toys. It was in use at any rate only for a very short time; being altogether unknown in the days of Pliny the elder. Our author therefore ridicules those who pretend not only to find out imperial coins of this metal, but to discover three kinds of it; viz. one in which the gold predominates, another in which the silver prevails, and a third where the brass is most conspicuous. He gives Æneas Vico, one of the most ancient writers on medals, as the author of this idea; but whose opinions were confuted by one Savot, a writer in the 17th century. Vico mentions a coin of this kind struck under Augustus, another of Livia, and a third of Claudius. The mistake, he is of opinion, arose from the circumstance of the first propagator not being able to account for the various mixtures and modifications of brass observable in ancient coins of the large size; and which in so common a metal appear very odd to the moderns.

Besides the authority of Pliny and other antiquaries of more modern date, who all declare that they never saw a single medal of Corinthian brass, or of that metal mixed with silver and gold, our author adduces another evidence, which he looks upon to be superior to either; viz. that those who have given into this supposition imagine, that the large pieces called *sestertii*, and others called *duponidiarii*, worth about twopence or a penny, are said to have been composed of this precious metal. It is unreasonable to think, that any proportion of gold or silver could have been made use of in these. The coins said to have been struck upon Corinthian brass are only done upon a modification of common brass; of which we know, that in proportion to the quantity of zinc made use of in conjunction with the copper, the metal assumes a variety of hues. On the authority of Pliny he informs us, that the coins mistaken for Corinthian brass were no other than prince's metal.

The Egyptian silver coins, struck under the Roman emperors, are at first of tolerably pure silver; but afterwards degenerate into a mixture of copper and tin with a little silver. They are very thick, but many of them are elegantly struck, with uncommon reverses. There are likewise three sets of brass coins belonging to this country, from the earliest times of the Roman emperors there. Some of these are of bell-metal or pot-metal; and after the time of Gallienus and Valerian, the coinage of brass with a small addition of silver becomes authorised by the state; the coins struck upon it being called *denarii æri*. Those of lead or copper plated with silver have been fabricated by Roman forgers. Some coins of lead, however, have been met with, of undoubted antiquity: and an ancient writer informs us, that tin money was coined by Dionysius; but none has been found. The lead coins of Tigranes king of Armenia, mentioned as genuine by Jobert, are accounted forgeries by Mr. Pinkerton and other modern medallists. Plautus, however, makes mention of leaden coins, and several of them have been found; but our author looks upon them to have been chiefly essay pieces, struck in order to let the artist judge of the progress of the dye. Others are the plated kind already mentioned, fabricated by ancient forgers, but having the plating worn off. A great number of leaden coins are mentioned by Ficorini, in a work entitled Piombi Antichi, in which he supposes them to have served as tickets for guests; and coins of the same kind are also mentioned by Passeri. In the work intitled Notitia Imperii Romani, there is mention of coins made of leather, but none of them have ever been found.

IV. *Of the Arrangement of Medals.*

It has already been observed, that one of the principal uses of medals is the elucidation of ancient history; hence the arrangement of medals is the first thing that must occur in the formation of a cabinet. The most ancient medals with which we are acquainted are those of Alexander I. of Macedon, who began to reign about 501 years before Christ. The series ought of consequence to begin with him, and to be succeeded by the medals of Sicily, Caria, Cyprus, Heraclia, and Pontus. Then follow Egypt, Syria, the Cimmerian Bosphorus, Thrace, Bithynia, Parthia, Armenia, Damascus, Cappadocia, Paphlagonia, Pergamus, Galatia, Cicilia, Sparta, Pæonia, Epirus, Illyricum, Gaul, and the Alps, including the space of time from Alexander the Great to the birth of Christ, and which is to be accounted the third medallic series of anciant monarchs. The last series goes down to the fourth century, including some of the monarchs of Thrace, Bosphorus and Parthia, with those of Comagene, Edessa or Osrhoene, Mauritania, and Judæa. A most distinct series is formed by the Roman emperors, from Julius Cæsar to the destruction of Rome by the Goths; nay for a much longer period, were it not that towards the latter part of it the coins become so barbarous as to destroy the beauty of the collection. Many series may be formed of modern potentates.

By means of medals we can with great certainty determine the various ornaments worn by ancient princes as badges of distinction. The Grecian kings have generally the diadem, without any other ornament; and though in general the side of the face is presented to view, yet in some very ancient Greek and Roman consular coins full faces of excellent workmanship are met with. On several coins also two or three faces are to be seen, and these are always accounted very valuable.

The diadem, which was no more than a ribband tied round the head with a floating knot behind, adorns all the Grecian princes from first to last, and is almost an infallible mark of sovereign power. In the Roman consular coins it is seen in conjunction with Numa and Ancus, but never afterwards till the time of Licinius, the colleague of Constantine. Dioclesian, indeed, according to Mr. Gibbon, first wore the diadem, but his portrait upon coins is never adorned with it. So great an aversion had the Romans to kingly power, that they rather allowed their emperors to assume the radiated crown, the symbol of divinity, than to wear a diadem; but after the time of Constantine it becomes common. The radiated crown appears first on the posthumous coins of Augustus as a mark of deification, but in somewhat more than a century became common.

The laurel crown, at first a badge of conquest, was afterwards permitted by the senate to be worn by Julius Cæsar, in order to hide the baldness of his head. From him all the emperors appear with it on their medals, even to our own times. In the lower empire the crown is sometimes held by a hand above the head, as a mark of piety. Besides these, the naval, mural, and civic crowns appear on the medals both of emperors and other eminent men, to denote their great actions. The laurel crown is also sometimes worn by the Greek princes. The Arsacidæ of Parthia wear a kind of sash round the head, with their hair in rows of curls like a wig. The Armenian kings have the tiara, a kind of cap which was esteemed the badge of imperial power in the east. Conical caps are seen on the medals of Xerxes, a petty prince of Armenia, and Juba the father, the former having a diadem around it.

The impious vanity of Alexander and his successors in assuming divine honours is manifest on their medals, where various symbols of divinity are met with. Some of them have an horn behind their ear, either to denote their strength, or that they were the successors of Alexander, to whom this badge might be applied as the son of Jupiter Ammon. This, however, Mr. Pinkerton observes, is the only one of these symbols which certainly denotes an earthly sovereign, it being doubted whether the rest are not all figures of gods. According to Eckhet, even the horn and diadem belong to Bacchus, who invented the latter to cure his headachs; and, according to the same author, the only monarch who appears on coins with the

horn is Lysimachus. We are informed, however, by Plutarch, that Pyrrhus had a crest of goats horns to his helmet; and the goat we know was a symbol of Macedon. Perhaps the successors of Alexander wore this badge of the horn in consequence. The helmet likewise frequently appears on the heads of sovereigns, and Constantine I. has helmets of various forms curiously ornamented.

The diadem is worn by most of the Greek queens, by Orodaltis, daughter of Lycomedes, king of Bithynia; and though the Roman empresses never appear with it, yet this is more than compensated by the variety of their head-dresses. Sometimes the bust of an empress is supported by a crescent, to imply that she was the moon as her husband was the sun of the state. The toga, or veil drawn over the face, at first implied that the person was invested with the pontifical office; and accordingly we find it on the busts of Julius Cæsar while Pontifex Maximus. It likewise implies the augurship, the augurs having a particular kind of gown called *luna*, with which they covered their heads when observing an omen. In latter times this implies only consecration, and is common in coins of empresses. It is first met with on the coins of Claudius Gothicus as the mark of consecration of an emperor. The *nimbus*, or glory, now appropriated to saints, has been already mentioned. It is as ancient as Augustus, but is not to be met with on many of the imperial medals, even after it began to be appropriated to them. There is a curious coin, which has upon the reverse of the common piece with the head of Rome URBS ROMA, in large brass, Constantine I. sitting amid victories and genii, with a triple crown upon his head for Europe, Asia, and Africa, with the legend SECURITAS ROMÆ.

In general only the bust is given on medals, though sometimes half the body or more; in which latter case the hands often appear with ensigns of majesty in them; such as the globe said to have been introduced by Augustus as a symbol of universal dominion; the sceptre sometimes confounded with the consular staff, a roll of parchment, the symbol of legislative power, and an handkerchief expressive of the power over the public games, where the emperor gave the signal. Some princes hold a thunderbolt, showing that their power on earth was equal to that of Jupiter in heaven; while others hold an image of victory.

Medals likewise afford a good number of portraits of illustrious men; but they cannot easily be arranged in chronological order, so that a series of them is not to be expected. It is likewise vain to attempt the formation of a series of gods and goddesses to be found on ancient coins. Mr. Pinkerton thinks it much better to arrange them under the several cities or kings whose names they bear. A collection of the portraits of illustrious men may likewise be formed from medals of modern date.

The reverses of ancient Greek and Roman coins afford an infinite variety of instruction and amusement. They contain figures of deities at full length, with their attributes and symbols, public symbols and diversions, plants, animals, &c. &c. and in short almost every object of nature or art. Some have the portrait of the queen, son, or daughter of the prince whose image appears on the face or obverse; and these are esteemed highly by antiquaries, not only because every coin stamped with portraits on both sides is accounted valuable, but because they render it certain that the person represented on the reverse was the wife, son, or daughter of him who appears on the obverse; by which means they assist greatly in the adjusting of a series. Some, however, with two portraits are common, as Augustus, the reverse of Caligula; and Marcus Aurelius, reverse of Antoninus Pius.

We find more art and design in the reverses of the Roman medals than of the Greek: but, on the other hand, the latter have more exquisite relief and workmanship. The very ancient coins have no reverses, excepting a rude mark struck into the metal resembling that of an instrument with four blunt points on which the coin was struck; and was owing to its having been fixed by such an instrument on that side to receive the impression upon the other. To this succeeds the image of a dolphin, or some small animal, in one of the departments of the rude mark, or in an hollow square: and this again is succeeded by a more perfect image, without any mark of the hollow square. Some of the Greek coins are hollow in the reverse, as those of Caulonia, Crotona, Metapontum, and some other ancient cities of Magna Græcia. About 500 B.C. perfect reverses appear on the Greek coins, of exquisite relief and workmanship. "The very muscles of men and animals (says Mr. Pinkerton) are seen, and will bear inspection with the largest magnifier as ancient gems. The ancients certainly had not eyes different from ours; and it is clear that they must have magnified objects. A drop of water forms a microscope; and it is probable this was the only one of the ancients. To Greek artists we are indebted for the beauty of the Roman imperial coins; and these are so highly finished, that on some reverses, as that of Nero's decursion, the *adventus* and *progressio* of various emperors, the *fundator pacis* of Severus, the features of the emperor, riding or walking, are as exact as on the obverse. But though the best Greek artists were called to Rome, yet the Greek coins under the Roman emperors are sometimes well executed, and always full of variety and curiosity. No Roman or Etruscan coins have been found of the globular form, or indented on the reverse like the early Greek. The first Greek are small pieces of silver, while the Roman are large masses of copper. The former are struck; the latter cast in moulds. The reverses of the Roman coins are very uniform, the prow of a ship, a car, or the like, till about the year 100 B.C. when various reverses appear on their consular coins in all metals. The variety and beauty of the Roman imperial reverses are well known. The medallist much values those which have a number of figures; as the *Puellæ Faustinianæ*, of Faustina, a gold coin no larger than a sixpence, which has 12 figures; that of Trajan, *regna assignata*, has four; the *congiarium* of Nerva, five; the allocution of Trajan, seven; of Hadrian, 10; of Probus, 12. Some Roman medals have small figures on both sides, as the *Apolloni sancto* of Julian II. Such have not received any peculiar name among the medallists. Others have only a reverse, as the noted *spintriati*, which have numerals I. II. &c. on the obverse."

The names of the deities represented on the reverses of Greek coins are never expressed; perhaps, as Mr. Pinkerton supposes, out of piety, a symbolical representation of their attributes being all that they thought proper to delineate; but the Roman coins always express the name, frequently with an adjunct, as VENERI VICTRICI, &c. In others, the name of the emperor or empress is added; as PUDICITIÆ AUGUSTÆ, round an image

of Modesty; VIRTUS AUGUSTI, a legend for an image of Virtue.

The principal symbols of the divine attributes to be met with on the Greek medals are as follow:

1. Jupiter is known on the coins of Alexander the Great by his eagle and thunderbolts; but when the figure occurs only on the obverses of coins, he is distinguished by a laurel crown, and placid bearded countenance. Jupiter Ammon is known by the ram's horns twisting round his ear; a symbol of power and strength, assumed by some of the successors of Alexander the Great, particularly by Lysimachus.

2. Neptune is known by his trident, dolphin, or being drawn by sea-horses; but he is seldom met with on the Grecian coins.

3. Apollo is distinguished by an harp, branch of laurel, or tripod; and sometimes by a bow and arrows. In the character of the Sun, his head is surrounded with rays; but when the bust only occurs, he has a fair young face, and is crowned with laurel. He is frequent on the coins of the Syrian princes.

4. Mars is distinguished by his armour, and sometimes by a trophy on his shoulders. His head is armed with a helmet, and has a ferocious countenance.

5. Mercury is represented as a youth, with a small cap on his head, wings behind his ears and on his feet. He is known by the cap, which resembles a small hat, and the wings. He appears also with the caduceus, or wand twined with serpents, and the *marsupium*, or purse, which he holds in his hand.

6. Æsculapius is known by his bushy beard, and his leaning on a club with a serpent twisted round it. He sometimes occurs with his wife Hygeia or Health, with their son Telesphorus or Convalescence between them.

7. Bacchus in known by his crown of ivy or vine, his diadem and horn, with a tiger and satyrs around him.

8. The figure of Hercules is common on the coins of Alexander the Great, and has frequently been mistaken for that of the prince himself. He appears sometimes as a youth, and sometimes with a beard. He is known by the club, lion's skin, and remarkable apparent strength; sometimes he has a cup in his hand, and a poplar tree, as a symbol of vigour, is sometimes added to the portrait.

9. The Egyptian Serapis is known by his bushy beard, and a measure upon his head.

10. Apis is delineated in the form of a bull, with a flower of the lotos, the water-lily of the Nile, supposed by Macrobius to be a symbol of creation; and Jamblichus tells us, that Osiris was thought to have his throne in it.

11. Harpocrates, the god of silence, appears with his finger on his mouth; sometimes with the sistrum in his left hand; a symbol common to most of the Egyptian deities.

12. Canopus, another Egyptian deity, appears in the shape of a human head placed on a kind of pitcher. "This deified pitcher (says Mr. Pinkerton) seems to refer to an anecdote of ancient superstition, which, I believe, is recorded by Plutarch. It seems some Persian and Egyptian priests had a contest which of their deities had the superiority. The Egyptian said, that a single vase, sacred to Serapis, would extinguish the whole power of the Persian deity of fire. The experiment was tried; and the wily Egyptian, boring holes in the vase and stopping them with wax, afterwards filled the vase with water; which, gushing through the holes as the wax melted, extinguished the Persian deity. Hence the vase was deified."

13. The *Holy Senate* and *Holy People* appear frequently on Greek imperial coins, sometimes represented as old men with beards, at others as youths.

The goddesses represented on medals are,

1. Juno, represented by a beautiful young woman, sometimes with a diadem, sometimes without any badge, which is reckoned a sufficient distinction, as the other goddesses all wear badges. Sometimes she appears as the goddess of marriage; and is then veiled to the middle and sometimes to the toes. She is known by the peacock, a bird sacred to her from the fable of Argus.

2. Minerva is very common on the coins of Alexander the Great; and her bust has been mistaken by the celebrated painter Le Brun for the hero himself. Her symbols are, her armour; the spear in her right hand, and the ægis with a Medusa's head in her left; an owl commonly standing by her.

3. Diana of Ephesus is commonly represented on the Greek imperial coins; and appears with a great number of breasts, supposed to denote universal nature. She is supported by two deer, and carries a pannier of fruit upon her head. The bust of this goddess is known by the crescent on her brow, and sometimes by the bow and quiver at her side.

4. Venus is known by an apple, the prize of beauty, in her hand. Sometimes she is distinguished only by her total want of dress; but is always to be known by her extraordinary beauty, and is sometimes adorned with pearls about the neck.

5. Cupid is sometimes met with on the Syrian coins, and is known by his infancy and wings.

6. Cybele is known by a turreted crown and lion: or is seen in a chariot drawn by lions.

7. Ceres is known by her garland of wheat, and is common on the Sicilian coins; that island being remarkable for its fertility. Sometimes she has two serpents by her, and is sometimes drawn in a chariot by them. She carries in her hands the torches with which she is fabled to have gone in search of her daughter Proserpine.

8. Proserpine herself is sometimes met with on coins with the name of κορη, or the girl.

9. The Egyptian Isis has a bud or flower on her head; a symbol of the perpetual bloom of the inhabitants of heaven. She carries also a sistrum in her hand.

10. The Sidonian Astarte appears on a globe supported on a chariot with two wheels, and drawn by two horses.

These are the deities most commonly represented on the Greek coins. The more uncommon are, Saturn with the scythe, or with a hook on the Heraclian coins; Vulcan with his tongs, on the reverse of a coin of Thyatira, represented at work in the presence of Minerva. Adranus, a Sicilian god, is sometimes represented on coins with a dog. Anubis, an Egyptian deity, has a dog's head. Atis is known by his Phrygian bonnet; Castor and Pollux by a star on the head of each; Dis, by his old face, dishevelled hair and beard, and a hook; Flora by a crown of flowers; Nemesis by her wheel; and Pan by his horns and ears belonging to some kind of beast.

There are likewise to be found on medals many different symbols by themselves; of the most re-

markable of which we shall give the following table, with their significations:

Symbols.	*Signification.*
1. Vases with sprigs, -	Solemn games.
2. Small chest or hamper with a serpent leaping out,	Mystic rites of Bacchus.
3. Anchor on Seleucian medals, -	Coin struck at Antioch, where an anchor was dug up.
Apollo on Syrian coins, on an inverted hamper, - - -	Covered tripod.
5. Bee, - -	Aristeus the son of Apollo.
6. Laurel, - - - -	Apollo.
7. Reed, - -	A river.
8. Ivy and grapes, -	Bacchus.
9. Poppy, - -	Ceres and Proserpine.
10. Corn, - -	Ceres.
11. Owl and olive, -	Minerva.
12. Dove, - -	Venus.
13. Torch, - -	Diana, Ceres, or Proserpine.
14. Mudnis, or conic stone,	The Sun, Belus, or Venus.

Symbols of Countries, &c.

15. Pomegranate flowers,	Rhodes.
16. Owl, - -	Athens.
17. Pegasus, - -	Corinth.
18. Wolf's head, -	Argos.
19. Bull's head, - -	Bœotia.
20. Minotaur's head and labyrinth, - -	Crete.
21. Horse's head, -	Pharsalia.
22. Lion, - -	Marseilles.
23. Tortoise, - -	Peloponnesus
24. Sphinx, - -	Scio.
25. Three legs joined, as in the Isle of Man-money,	Sicily.
26. Horse, - -	Thessaly.
27. The crescent, -	Byzantium.
28. Bull, - -	Supposed to be river.
29. Ensign with the letters COL. - -	A colony drawn from one legion.
30. Bull, - -	Apis, strength or security.
31. Caduceus, - -	Peace and concord.
32. Cornucopia, -	Abundance.
33. Pontifical hat, -	Priesthood.
34. Parazonium, -	Baton of command.
35. Globe on an altar with three stars, -	The world preserved by the gods for the three sons of Constantine I.
36. Fort and gate, -	Security.
37. Tribuli, a kind of chevaux de frize, -	Unknown.
38. Altar or tripod,	Piety.
39. Dolphin, - -	Apollo.
40. Lectisternia, -	Festivals.
41. Lituus, or twisted wand, - -	Augurship.
42. Apex, or cap with strings, - -	Pontificate.
43. Thensa, or chariot employed to carry images,	Consecration of an empress,
44. Peacock, - -	Consecration of an empress.
45. Eagle, -	Consecration of an emperor.

The legends put upon medals are designed as explanations of them; but as the compass of even the largest coins does not admit of any great length of inscription, it has always been found necessary to use abbreviations; and in readily decyphering these lies a considerable part of the difficulty of the science. This, however, is greater in the Roman than in the Greek medals; for the Greeks commonly insert as much of the word as is sufficient to enable us easily to understand its meaning; but it is common for those who attempt to explain letters that do not often occur to fall into very ridiculous errors. Of this Mr. Pinkerton gives a most remarkable instance in Fortunius Licetus, a learned man, who finding upon a coin of Adrian the letters Α. ΙΔ. signifying the 14th year of that emperor's reign, imagined that they signified *lucernas invenit Delta;* "Delta invented lanthorns;" and thence ascribed the origin of lanthorns to the Egyptians. Tables explaining the meaning of the abbreviations found upon medals have been published by Patin, Ursatus, and others.

V. *Of Medallions, Medallets, &c.*

Besides the ordinary coins of the ancients, which passed in common circulation through the country, there were others of a larger size, which are now termed *medallions.* These were struck on the commencement of the reign of a new emperor and other solemn occasions: frequently also, by the Greeks in particular, as monuments of gratitude or of flattery. Sometimes they were mere trial or pattern pieces; and those abound after the time of Maximian with the words *Tres Monetæ* on the reverse. The common opinion is, that all the Roman pieces of gold exceeding the denarius aureus, all in silver exceeding the denarius, and all in brass exceeding the sestertius, went under the denomination of medallions: but Mr. Pinkerton thinks that many of these large pieces went in circulation, though not very commonly, as our five and two guinea pieces, silver crowns, &c. do in this country. The finest medallions were presented by the mint-masters to the emperor, and by the emperor to his friends, as specimens of fine workmanship. The best we have at present are of brass, and many of them composed of two sorts of metal; the centre being copper, with a ring of brass around it, or the contrary; and the inscription is sometimes confined to one of the metals, sometimes not. There is a remarkable difference between the Greek and Roman medallions in point of thickness; the latter being frequently three or four lines thick, while the other seldom exceed one. Very few medallions, however, were struck by the Greeks before the time of the Roman emperors; but the Greek medallions of the emperors are more numerous than those of the Romans themselves. All these pieces, however, are of such high price that few private persons are able to purchase them. In the last century Christina queen of Sweden procured about 300. In the late king of France's collection there were 1200, a number formerly supposed not to exist; but Dr. Hunter's collection contains about 400, exclusive of the Egyptian.

Besides these large pieces, there are smaller ones of a size somewhat larger than our half-crowns; and by Italian medallists are called me-

daglion cini, or small medallions. They are still scarcer than the large kind.

There is still a third kind, which have almost escaped the notice of medallists, viz. the small coins or missilia scattered among the people on solemn occasions; such as those struck for the slaves on account of the Saturnalia; counters for gaming; tickets for baths and feasts; tokens in copper and in lead, &c. These are distinguished by Mr. Pinkerton by the name of medallets. Many, or perhaps almost all, of those struck for the Saturnalia were satirical; as the slaves had then a licence to ridicule not only their masters but any person whatever. Mr. Pinkerton mentions one of the most common pieces of this kind, which has on the obverse the head of an old woman veiled, with a laurel crown; the reverse only S. C. within a wreath. Baudelot is of opinion that it is the head of Acca Laurentia, the nurse of Romulus, to whom a festival was ordained. "Perhaps (says Mr. Pinkerton) it was struck in ridicule of Julius Cæsar; for the manner of the laurel crown, and its high appearance over the head, perfectly resemble that of Julius on his coins." Some have a ship upon one side; on the reverse T, or a cross, which was the image of Priapus; and occasioned many false invectives against the first Christians, who paid such respect to the cross. Some pieces have the heads of the emperors upon one side; on the reverse only numerals III. IV. V. &c. and the noted spintriati of Tacitus. Both these kinds appear tickets for the baths, as the number seems to denote the particular bath. Some have the head of a girl, with a vessel used at the baths in her hand. The spintriati are so immodest, that few will bear mention. But some are merely ludicrous; as one which has an ass with a bell about his neck, and a soldier riding him; another with two figures hoisting a woman in a basket into the air. Of those that will just bear mention, is a man with titles around him, as chief of the games; and a woman in ridicule of the modest bath-girl above-mentioned. There is also one marked XIX, on which appears an imperator triumphing in a car: this car is placed on the back of a camel; and behind the imperator is a monkey mimicking him.

A fourth class of medals are called *contorniati*, from the Italian *contornato*, encircled; because of the hollow circle which commonly runs around them. They are distinguished from medallions by their thinness, faint relief, reverses sometimes in relief, sometimes hollow; and in general by the inferiority in their workmanship. The opinions of medallists concerning these pieces are very various: some suppose them to have been struck by Gallienus to the memory of illustrious men and celebrated *athletæ*, at the time that he caused all the consecration coins of his predecessors to be restored; others ascribe their invention to Greece, &c. but Mr. Pinkerton is of opinion that they were only tickets for places at public games. Many of them, notwithstanding their inferior workmanship, are very valuable on account of their preserving the portraits of some illustrious authors of antiquity no where else to be found. Much dependance, however, cannot be put on the portraits of Greek authors and eminent men found upon some of them; for, though we know that the busts of Sallust, Horace, &c. must have been struck when their persons were fresh in the memory of the artists, yet it was otherwise with Homer, Solon, Pythagoras, &c. which are to be found on some of them. Even these, however, are valuable, as being ancient and perhaps traditional portraits of these great men. The last whose portraits are supposed to have been delineated in this way, are Apollonius Tyanæus who flourished in the time of Domitian, and Apuleius in that of Marcus Antoninus. Mr. Pinkerton thinks it a confirmation of his opinion concerning these medals, that the reverses always contain some device alluding to public games, as that of a charioteer driving a chariot, &c.

VI. *Directions for making Cabinets.*

We must now proceed to the last part of our subject, viz. that of giving directions for the formation of cabinets. As we have already seen that the formation of any one must be attended with very considerable expence, it is necessary for every one who attempts this to proportion the cabinet to his own circumstances. There are, properly speaking, three kinds of cabinets. I. Those meant to contain a coin of every sort that has been issued from the mint in every age and country; but this, which may be called the large and complete cabinet, is not to be purchased by private persons. That of Dr. Hunter already mentioned is perhaps one of the best private cabinets ever known; and cost 23,000l. but as many duplicates were sold as cost 2000l. by which means the expence was reduced to 21,000l. The vast collection made by the king of France cost upwards of 100,000l. The smaller cabinet may be supposed to consist only of middle and small Roman brass, English pennies, groats, &c. with a few medals of the more valuable kind, and may be supposed to incur an expence of from 200 to 1000l. The smallest kind is called a casket of medals, and does not consist of above a thousand at most of various kinds; and consequently the expence must depend on the pleasure of the proprietor.

In the formation of the grand cabinet, it must be observed that the Greek medals of every denomination do not admit of any arrangement by the metals like the Roman; not any regular series of this kind being met with even in the most opulent cabinets. Hence in all collections the civic coins are ranged according to an alphabetical order; and the monarchic in a chronological one. The same rule is to be observed in the Roman consular medals; they are ranged, like the coins of the Greek cities, in an alphabetical series of the families. The Roman imperial coins are only those capable of being arranged according to sizes and metals. Even from this must be excepted the minimi, or very smallest coins; which are so scarce, that the only regular series of them in the world is that belonging to the king of Spain, which was formed by a most skilful French medallist, and consists of all the metals. The arrangement of a grand cabinet, according to Mr. Pinkerton, is as follows:

"I. The coins of cities and of free states in alphabetical order; whether using Greek, Roman, Punic, Etruscan, or Spanish characters.

"II. Kings in chronological series, both as to foundation of empire and seniority of reign.

"III. Heroes, heroines, founders of empires and cities.

"IV. Other illustrious persons.

"V. Roman ases.

"VI. Coins of families, commonly called consular.

"VII. Imperial medallions.

"VIII. Imperial gold.

"IX. Imperial *minimi* of all metals.

"X. Imperial silver.
"XI. Imperial first brass.
"XII. Second brass.
"XIII. Third brass.
"XIV. Colonial coins, which are all of brass.
"XV. Greek cities under the emperors, of all metals and sizes. In a smaller cabinet they may be put with the Roman, according to their metal and size. Those without the emperor's head go to class I. though struck in Roman times.
"XVI. Egyptian coins struck under the Roman emperors, of all metals and sizes. They are mostly of a base metal called by the French *putin*; it is a kind of pot metal or brittle brass.
"XVII. Contorniati, or ticket medals.
"XVIII. Coins of Gothic princes, &c. inscribed with Roman characters.
"XIX. Coins of southern nations using uncommon alphabets; as the Persian, Punic, Etruscan, and Spanish.
"XX. Coins of northern nations using uncommon characters, as the Runic and German.

"In the modern part no series can be formed of copper that will go back above two centuries; but sequences (chronological series) of gold and silver may be arranged of all the different empires, kingdoms, and states, as far as their several coinages will allow. Those of England and France will be the most perfect. Modern silver is commonly arranged in three sequences; the dollar, the groat, and the penny sizes. The medals of each modern country ought of course to be separated, though it is best to arrange each set in chronological order, let their size of metal be what it will. It may be remarked here, that our modern medals, of the size of a tea-saucer, are only so many monuments of barbarism. The ancient medallions are almost universally but little larger than our crown-piece, though three or four of them may extend to about two inches diameter, but very many modern medals to four inches and more. A large medal always declares an ignorant prince or an ignorant artist. Into the size of a crown-piece the ancients threw more miracles in this way than will ever appear in these monstrous productions."

These directions will likewise apply to the formation of a cabinet of the second kind: but if the collector means to form a series of large Roman brass, he will find the coins of four or five emperors so scarce as not to be attainable in that series, even at any price. He must therefore supply their places with middle brass, and is allowed with regard to Otho: even in the best cabinets, there not being above three coins of that emperor in large brass known in the world; whereas of the middle brass, two or three hundred may exist. For this reason Mr. Pinkerton concludes, that in cabinets of the second class, the collector may mingle the large and second brass together as he thinks proper, in order to save expence; though it would not do so well to unite such disproportionate sizes as the large and small. "In the small sequence, however (says he), there can be no harm in his mixing gold, silver, and brass, as chance or curiosity may lead him to purchase any of these metals. And though your starched bigoted medallist may sneer because such a sequence would controvert his formal and narrow way of thinking, common sense will authorise us to laugh at the pedant in our turn, and to pronounce such a series more various, rich, and interesting, than if the collector had arranged only one metal, and rejected a curious article because he did not collect gold or silver. In like manner, if, in the modern part of the smaller cabinet, any coin of a series is of high price, or of bad impression, there can be no impropriety in putting another of the same reign, which is cheaper, or better executed, though of a different denomination, or of a little larger size. In short, the collector has no rules but in the Greek cities and Roman families, to observe alphabetical order and chronology in every thing else.

Tables of Ancient Coins.

The most ancient coins, according to Froelich, are distinguished by the following marks, which he accounts infallible: 1. Their oval circumference, and globulous swelling shape. 2. Antiquity of alphabet. 3. The characters being retrograde, or the first division of the legend in the common style, while the next is retrograde. 4. The indented square already described. 5. The simple structure of the mintage. 6. Some of the very old coins are hollowed on the reverse, with the image impressed on the front. 7. The dress, symbols, &c. frequently of the rudest design and execution.

TABLE I. *Ancient Greek Coins.*

1. Those without impression.
2. With one or more hollow indented marks on one side, and an impression in relief on the other. —Of Chalcedon on the Hellespont, Lesbos, Abdera in Thrace, Acanthus in Macedon, those said to belong to Egium in Achaia. This class continues from about 900 to 700 B.C.
3. With an indented square divided into segments, having a small figure in one of them: the rest blank, with a figure in relief on the obverse.— Of Syracuse and other places adjacent. Continue from 700 to 600 B.C.
4. Coins hollow on the reverse, with figures in relief on the obverse.—Of Caulonia, Crotona, Metapontum, &c. Supposed by some to be a local coinage of Magna Græcia; but probably of equal antiquity with the former.
5. Coins in which a square dye is used on one or both sides.—Of Athens, Cyrene, Argos, &c.— Of Alexander I. and Archelaus I. of Macedon. Disused in the reign of the latter about 420 B.C.
6. Complete coins, both in obverse and reverse, occur first in Sicily in the time of Gelo, about 491 B.C.
7. Coins of Alexander the Great and his successors. About the time of this hero the Greek coins began to attain to perfection, and were struck of uncommon beauty. It is remarkable, that on the coins of this monarch his own image seldom occurs. After his death many coins bear his portrait. Trebellius Pollio informs us, that some coins, particularly those of Alexander, used to be worn as amulets; and many medals are met with in cabinets bored seemingly with that intention.
8. Coins of the successors of Alexander.—Those of the Syrian monarchs almost equal the coins of Alexander himself in beauty. Those of Antiochus VI. are supposed to be the most perfect patterns of male beauty to be met with any where. The Egyptian Ptolemies are somewhat inferior.
9. The coins of the Arsacidæ of Parthia done by Greek workmen.
10. The Greek imperial coins, being such as have the head of an emperor or empress; such as have not these impressions being classed with the civic coins, though struck under the Roman

power. None of the imperial coins occur in gold. Of silver there are those of Antioch, Tyre, Sidon, Tarsus, Berytus, Cæsarea. Egyptian silver coins of base metal. Syrian silver coins, which sometimes bear on the reverse the club of Hercules, or the Tyrian shell-fish. Those of Sidon bear the image of the goddess Astarte, or her chariot. Those of Cæsarea in Cappadocia of better work than the Syrian. Lycian coins of good workmanship: on the reverse two harps and an owl sitting upon them. Silver coins of Gelon in Sarmatia resembling the Syrian. The situation of this town is very much unknown. It seems to have been situated on the north of the Euxine sea, where some Sarmatic or Sclavonic tribes were mingled with the Scythians or Goths. The Greek imperial brass coins are very numerous. A series of almost all the emperors may be had from those of Antioch, with a Latin legend on the obverse, and Greek on the reverse. Those of Bithynia and Phrygia remarkable for good workmanship. The coins of Tarsus, remarkable for their curious views of objects, almost in perspective. The Egyptian coins, from the time of Augustus to Nero, are worse executed than afterwards. From Nero to Commodus they are frequently of admirable workmanship, and in a peculiar style, distinct both from the Greek and Roman. From the time of Commodus they decline, and are lost after the reign of Constantius I. The Egyptian brass coins of the Roman period are likewise of excellent workmanship, especially in the time of Antoninus Pius.

TABLE II. *Roman Coins.*

I. The consular coins, called also the coins of families, and arranged alphabetically in cabinets, according to the names of the families which appear on them. They are,

1. *Brass Coins.*—These consist chiefly of large pieces of rude workmanship without any interesting imagery. In cabinets they are generally kept in boxes apart by themselves. The as bears the head of Janus; the semis of Jupiter with S; the triens of Minerva with four cyphers; the quadrans of Hercules with three cyphers; the sextans of Mercury with two cyphers; and the uncia bears the head of Rome with one cypher. In all these pieces the prow of a ship is constantly the figure on the reverse, with very few exceptions. Sometimes, indeed, they have a shell, two heads of barley, a frog, an anchor, or a dog, on the reverse. About the time of Julius Cæsar both the obverses and the reverses of the coins began to be altered.

2. *Silver.*—Of this the denarius was the first and principal coin. It was stamped originally with X, denoting that the value was ten ases. On the reverse was Castor and Pollux, or a chariot of victory. Afterwards the busts of various deities make their appearance; and in the seventh century of Rome the portraits of illustrious persons deceased are met with: but till the time of Julius Cæsar no figure of any living person is to be met with; Julius himself being the first who assumed that honour. The workmanship on the best and worst silver is much the same. The reverses are very curious, and point out many remarkable events in Roman history; but none of these occur till about a century before the Christian era. The large denarii, with ROMA, are the most ancient; and some of these bear the Pelasgic A, not the Roman. The silver sestertii have a head of Mercury, with a caduceus on the reverse. The quinarii have always a head of Jupiter, with a victory on the reverse.

3. *Gold.*—Most of these are of great value. The number of these exceeds not 100; those of brass 200; and of silver 2000. The aureus is the general gold coin; but two or three gold semisses of families likewise occur.

II. Roman imperial coins.

1. *Bra s.*—This is of three sizes; large, middle, and small. The first forms a most beautiful series, but very expensive. The various colours of the patina have the finest effect. It is the most important of all the Roman coins, and exceeds even the gold in value.

The middle brass is next in value to the former; and in it are many rare and curious coins, particularly interesting to Britons, as elucidating the history of the island. Of these are the triumphal arch of Claudius; the EXERC. BRITANNICUS of Adrian; the coins of Antoninus Pius, Commodus, Severus, with a victory, VICTORIA BRITAN. but especially those personifying the country BRITANNIA. "The number of Roman coins relating to Britain (says Mr. Pinkerton) is remarkable, more than 20 having been struck at various times; while those personifying Italy, Gaul, Spain, and other regions of the empire, exceed not four or six at most for each country. Only one country vies with Britain, and that is Dacia on the extreme north-east of the empire, as Britain on the extreme north-west. No doubt this circumstance of remoteness in these two countries recommended them to this particular attention, as more expressive of the Roman power.

The small brass series abounds also with curious coins. They are scarce till the time of Valerian and Gallienus, but very common afterwards. Mr. Pinkerton recommends, therefore, to form a series in silver as well as brass; both being the cheapest of all the Roman coins. "In this series (says he) it is a common fault to arrange many coins which have been plated with gold or silver, the forgeries of ancient times, but which time has worn off either wholly or in part. All real brass coins have the S. C. till the time of Gallienus; as the senate alone had the power of striking brass, while the emperor himself had that of gold and silver. When the S. C. therefore is wanting, the coin was certainly once plated; as, in general, the different type and fabric, being those of gold and silver, sufficiently show themselves. With Pertinax, A.D. 192, there is a temporary cessation of small brass; nor after him do any princes occur in that series till Valerian, A.D. 254, excepting Trajanus Decius, A.D. 250 only. After Valerian the series is continuous and common. The brass coinage gradually declined in size from the time of Severus; so that part of the as could not be struck, or at least it was held unnecessary to strike them. Trajanus Decius attempted in vain to restore the coinage; and Valerian and Gallienus were forced to issue denarii ærei and small assaria. The series of large and of middle brass are of two fixed and known sizes; the former about that of our crown, the latter of the half-crown: though after Severus they gradually lessen. But the small brass takes in all parts of the as; and every brass coin not larger than our shilling belongs to this series. The minimi, indeed, or very smallest, it is proper to keep apart. The coins of Julius Cæsar in this size are of peculiarly fine workmanship. They bear his portrait reverse of Augustus, or the reverse has a crocodile EGYPTO CAPTA. There are several with M.. ..

Antony, and some with Cleopatra; but the more common pieces are those with only numerals on the obverse, which go the length of XIII; probably tickets for the baths. A great many occur in the time of Nero; of which Mr. Pinkerton particularises one which has "on the reverse a table ornamented with griffins and other devices. Upon it is placed a wreath of laurel, and a beautiful vase, of which the embossed human figures are so minute, and finished so surprisingly, as to stamp these coins the most exquisite productions of the ancient mint." From the time of Nero to that of Vespasian no small brass occurs: but there are many of this emperor and of his son Titus; while Domitian has as many as Nero, and Domitia his wife has almost as many. Succeeding emperors to the time of Pertinax have also many brass coins; but from his time to that of Valerian there are no real small brass, excepting those of Trajanus Decius. After Gallienus there are a great many coins of this kind; and Mr. Pinkerton mentions one in Dr. Hunter's cabinet, of an unknown person named Nigrianus. The coin seems to have been struck at Carthage; and our author concludes that he was an African usurper, father to Nigrinianus.

2. *Silver*.—This series is very complete, and the cheapest of any; especially as the small brass becomes a fine supplement to it: the latter being had in plenty when the silver becomes scarce, and the silver being plentiful when the brass is scarce.

3. *Gold*.—The Roman imperial gold coins form a series of great beauty and perfection; but on account of their great price are beyond the purchase of private persons.

4. The *colonial coins* occur only in brass, none, excepting that of Nemausus, having a right to coin silver. They begin in Spain with Julius Cæsar and Antony, and cease with Caligula, who took away the privilege of coinage from the Spanish colonies. The most beautiful are those of Corinth. The other remarkable colonial coins are those of Emerita, Ilice, Terraco, Cassandria, Babba, Berytus, Cæsarea, Patræ, Emisa, Heliopolis or Balbec, Ptolemais, Sidon, Tyre, Deulton, Dium, Troas, Rhesaina, Neapolis of Samaria, which bears a representation of Mount Gerizzim with the temple on it, Hippo in Africa, &c. On many of these coins we meet with fine representations of temples, triumphal arches, gods, goddesses, and illustrious persons. But coins with those representations are by no means common; the colonial coins till the time of Trajan bearing only a plough, or some other simple badge of a colony. Camelodunum is the only colony in Britain of which we have any coins.

5. The *minimi*.—This includes the smallest coins of all denominations, most of which do not exceed the size of a silver penny. They are the most curious of all; but no series of them was ever formed by any person except the Abbe Rothelin, whose collection formed of all metals passed to the queen of Spain. The reason of the scarcity of these small coins is probably their diminutive size; by reason of which they are mostly lost.

It is surprising that numbers of Roman coins are found through all countries once subject to that powerful people. Some have been met with in the Orkneys, and many in the most remote parts of Europe, Asia, and Africa, known to the ancients.

TABLE III. *Coins of other ancient Nations.*

1. The Lydians appear to have invented coinage; though, perhaps, this honour may be disputed with them by the Greeks.

2. The Assyrians, Medes, Babylonians, Phœnicians, and Egyptians, had no coins. In the mouths of the mummies are only thin, unstamped, and round pieces of gold to pay Charon's fare.

3. No Indian or Chinese coins are to be met with till a very late period; and even then so rude as scarce to be worth notice. Voltaire mentions a collection of ancient Chinese and Indian coins made by the emperor of China in 1700; but Mr. Pinkerton supposes it to have consisted only of the Greek and Roman money which had been introduced into these countries.

4. The Lydian coins have no legends; so that mere conjecture only determines the ancient coins of electrum and silver found in Asia, and different from the Persian, to belong to Lydia. Crœsus coined gold into a form which he called staters; and Mr. Pinkerton mentions a very ancient gold coin in Dr. Hunter's cabinet, which he supposes to have been one of these. It has a globous figure, with indented marks on one side, and on the other a man kneeling, with a fish held out in the left hand, and a sword depending in the right. It weighs four drachms; which Josephus tells us was the weight of the Lydian gold coins. In the same collection are other gold coins little inferior in antiquity; the most ancient of which, our author supposes, may have been coined by the cities of Asia Minor, as coinage passed through them to Greece. They are of admirable workmanship, and as much superior to the best Sicilian coins, as the latter are to all the rest in the world. These gold coins are all extremely pale; owing to the want of knowledge in refining gold.

5. Persian coins.—These were first struck by Darius Hystaspes, whence they had the name of darics. They are of gold, and generally have the figure of an archer: they weigh about four drachms; and some occur with the indented mark on one side, while others have figures upon both. The silver coins have generally a king in a chariot of two horses, with a charioteer, and sometimes another figure on foot behind on the obverse; while the reverse presents a ship, sometimes a ram, bull, or other animal. The gold coins, which only had the title of darics, are extremely scarce, having been melted down, as is supposed, and re-coined by Alexander the Great on his conquest of Asia.

There is a second series of Persian coins beginning with Artaxares, or Artaxerxes, who overthrew the Parthian monarchy about the year 210. These are large and thin, with the king's bust on one side and the altar of Mithras on the other; generally with a human figure on each side. These coins continue till the year 636, when Persia was conquered by the Saracens. They have only Persian letters upon them, which have never been explained by any antiquaries. Mr. Pinkerton says that they seem to partake of the ancient Greek, Gothic, and Alanic.

6. The Hebrew shekels, originally didrachms, but after the time of the Maccabees tetradrachms, are almost all forgeries of modern Jews, as well as the brass coins with Samaritan characters upon them. They have all a sprig upon one side and a vase on the other. Mr. Pinkerton says, that the admission of one of them into a cabinet would almost be a disgrace to it.

7. Phœnician and Punic coins are very interesting on account of the great power and wealth of these nations. The alphabets have been cleared

by their relation to the Hebrew and Syriac languages.

8. The coins of Palmyra come under the same denomination with the former, Palmyra being a Syrian city.

9. The Etruscan coins have the characters of that nation, which have been explained by their affinity to the Pelasgic, or oldest Greek and Latin.

10. The Spanish coins are inscribed with two or three alphabets allied to the old Greek or Punic; but the inscriptions have not been sufficiently explained.

11. Gaulish coins.—These are numerous; but the most ancient have no legends; and even after the Greek letters were introduced into Gaul by a colony at Marseilles, the legends are very difficult to be explained.

12. British coins.—From a passage in Cæsar's Commentaries, it has been inferred that the Britons used some kind of coins even in his time. Mr. Pinkerton informs us, that some rude coins of copper very much mingled with tin are frequently found in England; which, he supposes, may be some of the ancient British money. They are of the size of a didrachm, the common form of the nummus aureus among the ancients. After the time of Cæsar, coinage increased among the Britons; and there are many found of Cunobelinus mentioned in the Roman history. Most of these have on one side CUNO, with an ear of wheat, a horse, a kind of head of Janus, or other symbol; and have frequently also the letters CAMU; supposed to mean Camelodunum. Sometimes the word TASCIA occurs; the meaning of which has not yet been explained.

13. Gothic coins of France, Italy, and Spain, to the time of Charles the Great.—These have the Roman characters upon them. The Italian coins are mostly of the size of small brass; and in this way we meet with coins of Athalaric, Theodahat, Witigez, and other Gothic princes. Many others occur, the inscriptions of which, though meant for Roman, are so perverted as to be illegible.

TABLE IV. *Modern Coins.*

1. Of Japan.—These are thin plates of gold and silver, of an oval figure, with small marks or figures stamped on them.

2. China.—These are only copper, about the size of a farthing, with a square hole in the middle to put them on strings. The inscriptions on them do not express the name of the sovereign, but the year of his reign; as the *happy year*, the *illustrious year*, &c.

3. The Tartarian coins are rude, having only inscriptions upon them; and they are all posterior to the time of Jenghiz-khan.

4. Coins of Thibet, Pegu, and Siam, are much the same, presenting only inscriptions without any figures. They are also of late date.

5. India.—Some old coins have been found in the neighbourhood of Calcutta, of gold, silver, copper, and tin, all mixed together. These have commonly a warrior with a sword on one side, and an Indian female idol on the other; of the same form with the celebrated sculptures in the island of Elephanta, but it is impossible to tell what antiquity they are of. The modern coins are the pagoda of gold, worth little more than six shillings; the rupee of silver, upwards of two shillings; and the cash, of copper. There is a remarkable set of rupees, which show the twelve signs; a lion on one, a bull on another, &c. but the occasion on which they were struck is unknown. The other coins of India have generally Persian inscriptions upon them.

6. Persia.—The Persia coins since its conquest by the Arabs continue on the Arabian model.

7. Arabia.—Some coins of the petty princes of Arabia are met with as old as the imperial ages of Rome; but till the time of Haroun Alrashid, no regular coinage appears in the vast empire of the Saracens. Even then the reverse has only an inscription, and the obverse is copied from any Greek or Syrian coin which happened to fall in the moneyer's way. The later Arabian coins are mostly silver, with the name and titles of the prince on one side, and some inscription from the Koran on the other. The more modern coins of this country are in the shape of a fish-hook, with Arabic inscriptions.

8. Turkey.—No regular coinage was formed by the Turks till they became masters of Constantinople. They resemble those of Persia and Arabia, having merely inscriptions on both sides.

9. The coins of the African states, at least such as profess the Mohammedan religion, have merely inscriptions without any figures: those of the internal parts are unknown; and no coinage was used among the Mexicans and Peruvians, the only civilized nations in America; but La Hontan mentions an American savage who had a square medal of copper depending from his neck. Mr. Pinkerton supposes it to have come from Japan.

10. Modern Italic coins.—Besides the Gothic princes mentioned in the former tale, the exarchs of Ravenna coined money with the inscription FELIX RAVENNA, &c. The Lombards issued no coins, but there are some still extant of Charlemagne. The following list shows the origin of the coinage in various Italian states.

Rome.—Papal coinage originates with Hadrian I. Size of silver pennies, with the Pope's name on one side, and SCOS PETRUS on the other. No coins appear from 975 to 1099, excepting of Leo IX. In 1303 appear pennies of the senate and people of Rome, with Peter on the one side and Paul on the other. There are groats of Clement V. with his portrait three quarters length; but the side head begins with Sixtus V. in 1470. Gold was first coined by John XXII. in 1316. The coins of Alexander VI. Julius II. and Leo X. are remarkable for beauty and elegance.

Milan.—Coinage began with Charlemagne. The first coin of the family of Visconti occurs in 1330 under Azo. The set finishes with Louis XII.

Naples.—Coinage begins in 840 and 860, with duke Sergius and bishop Athanasius. The next coins are of Roger of Sicily, and Roger II. in 1130, William I. II. and Tancred. Naples and Sicily were subdued in 1194 by the emperor of Germany; in 1255 Manfred appears: in 1266 Charles of Provence; and others till Joan in 1414: after which follow the house of Arragon, and later kings.

Venice begins in the 10th century. The first coins are silver pennies marked VENECI. Then follow the coins of Henrico Dandulo in 1192, of Ziani in 1205, &c. Gold was first coined at Venice in 1280, and copper in 1471; but the silver groats are as old as 1192.

Florence.—Silver was coined here in the 12th century, or before; but in 1252 the first gold coins struck in Europe after the 8th century made their appearance, and were named florins from the flower of the lily upon them. They were imitated by the popes, by France, and England. They have

on one side St. John the Baptist standing, on the other a large fleur de lis, and it is not doubted that the French fleurs de lis took their origin from these coins. They weigh a drachm, and are no less than 24 carats fine according to Italian writers, and are worth about 12 shillings.

Geneva first began to coin money in 1129, under the government of Conrad. Those of the dukes of Savoy began in the same century.

Aquileia.—Coins were issued from this city by the patriarchs from 1204 to 1440.

Ferrara.—Coins of the marquises from 1340.

11. French coins.—During the race of Clovis, from 490 till 751, the coins are chiefly gold trientes, with some solidi and semisses. The former are of good workmanship, with the heads of kings. The reverse has a cross with the name of the town where they were struck.

The coins of the second race begin with Pepin in 751, and continue till Hugh Capet in 987. The coins of the first race are elegant, but those of the second entirely the reverse, being almost all silver pennies, and seldom bearing the portrait of the king. Those of Charlemagne have only CAROLUS in the field; while the reverse bears R. F. or some such inscription; though one piece struck at Rome has a rude bust of him. The coins of Louis le Debonnaire are better done.

The third race begins with Hugh Capet in 987, and extends to this time. The coinage did not begin to improve till 1226 under St. Louis, when the groat appears. Its name in Italian is grosso, in French grosse, in English groat, or great coin; so called from its size in comparison with the penny; and it passed from Italy to France, to Germany, and to England. After the conquest of France by the English, base coins of many kinds were introduced; and in the year 1574, in the time of Henry III. copper was first introduced into the French coinage. Besides these, the other remarkable coins of France are, the blancs or billon groats, first issued in 1348; the ecus à la couronne, or crowns of gold, so called from the crown on one side, and begun by Charles VI. in 1384: those of Ann of Bretagne in 1498: the teston, or piece with the king's head, of Louis XII.; the henri of Henry II. with Gaul sitting in armour, and a victory in her hand. There are many coins of cardinal Bourbon, elected king in 1589; and in 1642, Louis XIV. takes the title of CATALONIÆ PRINCEPS. The first louis d'or made its appearance in 1640; but such was the poverty of France, if we believe certain authors, that in 1719 the duke of Orleans regent struck copper for silver.

12. Spanish coins.—The most early series of these consists almost entirely of trientes, finely done. On one side they have the head of the king with his name, and on the other a cross, with the name of the town, commonly in Bætica, or the south part of Spain, where there were a great many Roman colonies, and which was fertile to a proverb. The Moresque coins of Spain, like those of the rest of the Mohammedan states, present us only with insipid inscriptions on both sides. Indeed the Mohammedan religion, by its absolute refusal to allow the representation of any living creature, has prevented the progress of coinage in any degree throughout those regions which it has overspread. The inscriptions on the ancient Spanish coins are in the Cufic or old Arabic characters.

13. Portugal.—No description of the coins of this kingdom has yet appeared.

14. Germany.—No account of the German coins has been published; though it is well known that not only the emperors, but many of the cities, particularly those called Hanse-towns, issued money; and many of the coins issued by the cities were superior in elegance even to those issued by the emperors.

15. Denmark.—Here the coinage begins with Canute the Great in 1014. The pieces are at first extremely rude, ornamented only with rings and Runic characters. These are succeeded by copper pieces, some of which have a cross, others a pastoral staff on one side, with the letter A on the other. Later coins have strokes 1111, &c. all round them; but those of Harold, Hardicanute, and Magnus Bonus, in 1041, are of neat workmanship, and have the portraits of the princes at half-length. The coins of Nicholas or Niel, as he is called by the Danes, are rude, as well as those of Waldemar I. and the celebrated Margaret. In 1376 Olaf caused money to be struck with a grinning full face, with a crowned O upon the other side. "The Swedes (says Mr. Pinkerton) took these coins extremely ill, as they thought they grinned at them." Silver was first coined in Denmark by Philippa queen of Eric, and daughter to Henry IV. of England.

16. Sweden.—The coinage of this kingdom began in 818 under Biorno, on the plan of Charlemagne. These coins are marked with a cross. Next follow those of Olaf in 1019; which Mr. Pinkerton supposes to have been the first true Swedish coins; and that the art of coinage first passed from England into Denmark in the time of Canute the Great, and from Denmark into Sweden. These coins were struck on the English model. During the time that Sweden was subject to Denmark, or miserably harassed by the Danes, the coins of both kingdoms were the same: but after the time of Gustavus Vasa many elegant pieces appear. In 1634, dollars were coined with the portrait of Gustavus Adolphus, who was killed two years before: on the reverse they have the arms of Sweden, with the chemical marks of mercury and sulphur. In 1716, 1717, and 1718, Charles XII. being in extreme want of money, issued small copper coins with Saturn, Jupiter, Mars, &c. upon them, to go for dollars; and on account of this scheme, Baron Goertz, the suggester of it, was brought to the block.

17. Norway.—The coins of this country begin with Olaf in 1006; after which time there are various coins of other princes; but copper was not coined till the year 1343.

Besides the coins already mentioned, there are ecclesiastic coins of France, Germany, Denmark, Sweden, Norway, &c. Those of Denmark and Sweden are numerous, but the Norwegian coins of this denomination are rare. Mr. Pinkerton describes a silver one in his possession as having arms and a mitre, with the inscription on one side SANCTUS OLAWS REX NORVEY; on the reverse OLAWS DEI GRA. ARCEP NID'SEN, meaning NIDROSIENSIS, or Archbishop of Nidros, now Drontheim.

18. Bohemia.—The coinage of this kingdom appears at a very early date, viz. in the year 909, under duke Boleslaus I. These coins are followed by others of Boleslaus II. and Emma his wife in 970; of Boleslaus III. in 1002; Jaromir in 1020; Udalrich in 1030, and other princes. The *bractate* money of Ortocar I. was coined in 1197.

19. Poland.—The coinage of this country is nearly as ancient as that of Bohemia. The coins are on the German model, but no particular account of them has been published.

20. Russia.—None of the Russian money appears to be more ancient than the 13th century. The first are the kopecks or silver pennies, which have upon them rude figures of animals on one side, and a man standing with a bow or spear on the other. There are likewise coins of Moscow struck by Aristoteles the architect in 1482. The roubles or dollars and their halfs. There are some of the impostor Demetrius in 1605, which are very scarce.

21. Prussia.—The first Prussian coins were struck at Culm by the Teutonic knights in 1260. They were silver pennies, and upon the German plan. In the next century were struck shillings, groats, and schots; the last were the largest, and are extremely rare. They have the Prussian shield, an eagle surmounting a cross, with a rose-shaped border, MONETA DOMINORUM PRUSSIÆ: on the reverse is a cross fleuric, within a border of a similar kind, having the inscription HONOR MAGISTRI, JUSTITIAM DILIGIT.—Gold coins were struck in the same century. In the time of Copernicus the money was so debased, that 12 or 13 marks were worth but one of pure silver.

22 England.—The English coins are of various kinds.

1st. Heptarchic.—These are only of two sorts, viz. the skeatta or penny of silver, and the styca of copper. Few of the pennies appear till after the year 700, though some are met with which bear the name of Ethelbert I king of Kent, as old as 560. At first they had only rude figures of serpents, but in later times legends were likewise added. Most of their pennies have pagan symbols upon them. The styca was only coined in Northumberland, and was a very small piece about the value of half a farthing.

2d Coins of the chief monarchs of England. Mr. Pinkerton denies that an end was put to the heptarchy by Egbert in 832, as is commonly supposed; though he owns he was chief monarch of the country, as several others had been before him Edgar, who reigned in 959, according to him was the first king of England; and the coins of the chief monarchs form almost a complete series from the time of Egbert to Edgar. The only chief monarch of whom there are no coins is Ethelbald, who reigned in 857. Most of these coins bear rude portraits; but the reverses are sometimes curious and interesting. Some have views of cathedrals and other buildings; particularly one of Edward the Elder in 900; which has the cathedral of York with three rows of windows, round arched as the other Saxon and Norman buildings; the Gothic arch being quite unknown till after the 12th century. Some coins of Anlaf king of Northumberland have the famous raven, the Danish ensign; and those of other princes have frequently very curious reverses.

3d. Ecclesiastic coins appear of the archbishops of Canterbury, Wulfred, in 804, Ceolnoth in 830, and Plegmund in 839.

4th Coins of the kings of England. The silver penny, which had begun during the heptarchy, continued to be the general coin after the kingdom had been united under one head; and extends in a continued series from Egbert almost to the present reign. The only kings wanting are Edmund Ironside, Richard I. and John. At first the penny weighed $22\frac{1}{2}$ grains; but towards the close of the reign of Edward III. it fell to 18 grains; and in that of Edward IV. to 12. In the time of Edward VI. it was diminished to eight grains; and in queen Elizabeth's reign to $7\frac{31}{32}$; at which it still continues.

Halfpennies and farthings were first struck in silver by Edward I. in 1280; the former continued to the time of the commonwealth, but the latter ceased with Edward VI. The groat was introduced by Edward III. in 1354, and continues to this day, though not in common circulation. The half-groat or twopence is of the same date, and also continues to the present time.

Shillings were first coined by Henry VII. in 1503. At first it was called testoon, from the teste, tete, or head of the king upon it; the name shilling being derived from the German schelling; under which appellation coins had been struck at Hamburg in 1407. The crown was first coined in its present form by Henry VIII. Formerly it had appeared only in gold, whence the phrase of crowns of gold; though these indeed were the largest gold coins known for a long time in France and other countries on the continent, being worth about 10s. sterling. They had their name from the crown stamped on one side, and were first coined by Charles VI. in 1384, and continued till the time of Louis XIV. The half-crown, sixpence, and threepence, were coined by Edward VI. In 1558 queen Elizabeth coined three-halfpenny, and in 1561 three-farthing, pieces; but they were discontinued in 1582. From the year 1601 to the present time the coins of England remain the same.

Gold was coined in England by Henry III. in 1257; the piece was called a gold penny, and was larger than the silver one; and the execution is by no means bad for the time. The series of gold coinage, however, commences properly from Edward III. In 1344 this monarch first struck florins, in imitation of those in Italy; and it is remarkable, that though these coins at the time they were first issued bore only six shillings value, they are now intrinsically worth 19s so much has the value of gold increased since that time. The half and quarter florin were struck at the same time, but only the last has been found. The florin, however, being found inconvenient, gave place to the noble of 6s. 8d. value, and exactly half a mark. The latter had its name from being a limited sum in accounts; and was eight ounces in weight, two-thirds of the money pound. It is sometimes also called selibra, as being one half of the commercial pound of 16 ounces. The noble had its name from the nobility of the metal; the gold of which it was coined being of the finest sort. Sometimes it is called rose noble, from both sides being impaled in an undulating circle. It continued with the half and quarter noble to be the only gold coin till the angels of Edward IV. appeared in 1465. These had their name from being stamped with the image of Michael and the dragon The angelites of 3s. 4d. value were substituted in their place. In 1527 Henry VIII. added to the gold coins the crown and half-crown at their present value; and the same year he gave sovereigns of 22s. 6d. and royals of 10s. 3d. angels at 7s. 6d. and nobles at their old value of 6s. 8d. In 1546 he caused sovereigns to be coined of the value of 20s. and half sovereigns in proportion. His gold crown is about the size of our shilling, and the half-crown of sixpence, but thin. All his coins, however, gold as well as silver, are much debased; and it was not without much labour and trouble that Edward VI. brought it back to its former standard. On the union of the two crowns, James gave the sovereign the name of unite; the value continuing of 20s. as before. He coined also rose-ryals of 30s. value, spur-ryals of 15s. angels of 10s.

and angelets of 5s. Under the commonwealth, the sovereign got the name of the twenty shilling piece, and continued current till the coinage of guineas. These were so called from their being coined of Guinea gold, and were at first only to go for 20s. though by an universal but tacit consent they always passed for 21s. Half-guineas, double guineas, and five guinea pieces, were also coined during the same reign; which still continue, though the two latter are not in common circulation. Quarter guineas were coined by George I. and likewise by his present majesty; but they were found so troublesome on account of their small size, that they were stopped within a year or two when received at the Bank of England; and thus are not to be met with at present. A few pieces of 7s. value have likewise been coined, and are known by the lion above the helmet; but none were then issued. In 1688 the guinea rose to 21s. 6d. and continued to increase in value till 1696, when it was as high as 30s. but after the recoinage in 1697 and 1698 it fell by degrees, and in 1717 was at its old standard of 21s. and at that time silver was fixed at its present standard value, viz. as one to 15½ in weight.

Though the first money coined in Britain, as we have already observed, was copper, yet, excepting the Northumbrian stycas, no copper coin was found in England from the time of the Saxon conquest till the year 1672. An aversion to a copper coinage, it seems, was prevalent throughout the nation; and queen Elizabeth, who without hesitation used base money for Ireland, yet scrupled at coining copper for England. This want of small coin occasioned such an increase of private tokens for halfpennies and farthings, that it became a serious object to government; and in 1594 a copper coinage was seriously thought of. This year a small copper coin was struck about the size of a silver twopence, with the queen's monogram on one side, and a rose on the other; the running legend on both sides being THE PLEDGE OF A HALFPENNY. Of this there are patterns both in copper and silver, but both of them soon fell into disuse. On the 19th of May 1613, king James, by royal proclamation, issued farthing tokens. They are generally of the same size with the twopence, with two sceptres in saltier surmounted with a crown, and the harp upon the other; with an intention, as it would seem, that if they were refused in England they might pass in Ireland. In 1635 Charles I. coined those with the rose instead of the harp; but the circulation of these was entirely stopped by the vast number of counterfeits which appeared, and by the king's death in 1648. After this the private tokens began again to circulate, till put a stop to by the coinage of farthings in 1672. The workmanship of the tokens is quite contemptible. In 1672 the halfpence as well as the farthings which had been struck two years before began to circulate. They were of pure Swedish copper, the dyes engraved by Roettier; and they continued till the year 1684, when some disputes arose about the copper lately obtained from the English mines. Tin farthings were coined with a stud of copper in the centre, and inscribed round the edge as the crown pieces, with NUMMORUM FAMULUS, 1685 or 1686. In 1685 halfpence of the same kind were coined; and the tin coinage continued till the year 1692, to the value of more than 65,000l. but next year the tin was all called in by government, and the copper coinage recommenced. The farthings of queen Anne are all trial pieces, excepting those of 1714, the last year of her reign. They are (says Mr. Pinkerton) of exquisite workmanship, exceeding most copper coins either ancient or modern, and will do honour to the engraver, Mr. Croker, to the end of time. The one, whose reverse is peace in a car, PAX MISSA PER ORBEM, is the most esteemed; and next to it the BRITANNIA under a portal. The other halfpence and farthings are less valuable.

23. Scotland.—Silver pennies of Alexander I. who reigned in 1107, are believed to exist; and there certainly are some of Alexander II. in 1214. There are likewise coins of David in 1124, but perhaps none of Malcolm IV. his successor, whose reign was very short. There are many coins of William I. in 1165, and a large hoard of his pennies was found at Inverness in 1780.

The money of Scotland continued to be of the same value with that of England till the country was drained by the vast ransom of David II. after which it became necessary to reduce its size; and so much did this diminution affect England, that Edward III. found himself obliged to lessen the English coin also. The diminution of the Scottish coin, however, continued still to go on until it became impractible to keep par with that of England. In the first year of Robert III. it passed only for half its nominal value in England: in 1393 Richard II. ordered it only to go for the weight of the genuine metal it contained. In 1600 it had sunk to such a degree as to pass only for a twelfth part of the English money, and continued at that low ebb till the coinage of Scotland was entirely cancelled by the union of the two kingdoms.

Of silver coins we have only pennies till the year 1293, when Edward I. having coined halfpence and farthings, Alexander III. of Scotland coined also halfpence, of which we have a few, but no farthings are to be met with; but there are silver farthings of Robert I. and David II. The latter introduced the groat and half-groat, which completed the set of Scottish silver. It continued unaltered till the time of queen Mary, when they all ceased to be coined in silver, on account of the high price of that metal. In 1553 shillings were first coined, with the bust of the queen on one side, and the arms of France and Scotland on the other. The silver crown was first coined in 1565, which went for 30s. Scots; lesser pieces of 20s. and 10s. having likewise been struck, and marks of silver worth 3s. 4d. English, were also coined about the same time. These coins have upon them the marks XXX. XX. X. to denote their value. They are commonly called Cruickstone dollars, from the palm-tree upon them, mistaken for a remarkable yew at Cruickstone near Glasgow, where Henry Darnley resided. It is described, however, in the act as a palm, with a shell-padoc (a tortoise) crawling up. This alludes to Darnley's marriage with the queen, as the motto from Propertius, DAT GLORIA VIRES, also implies. The motto NEMO ME IMPUNE LACESSET first appears on the Scottish coins in 1578, and the invention is given to the celebrated Buchanan. In 1582, the crown of an ounce weight went for 40s. Scots, and was accordingly marked XL. in 1597 the mark was L. the Scottish money being then only one-tenth of the English: the mark was LX. in 1601, the value being then reduced to one-twelfth, at which it has ever since continued. In the time of Charles I. half marks, 40 and 20 penny-pieces, were coined.

In 1675 the Scottish dollars first appeared, in value 56s. Scots, with halves and quarters of proportional value. In 1686 James VII. coined 60, 40, 20, 10, and 5s. pieces; but only those of 40 and 10s. are known, with these numbers under the bust. At the union of the kingdoms all the Scottish coins were called in, and recoined at Edinburgh, with the mark E under the bust to distinguish it; since which there has been no coinage in Scotland. The Scottish silver coins are in general equal, if not superior, in the workmanship to the English.

Gold was first issued by Robert II. about 30 years after Edward III. of England had coined the same metal in that country. The pieces were at first called St. Andrews, from the figure of that tutelar saint upon the cross, and who appears on the obverse with the arms of Scotland, and on the reverse a lion in a shield. The lion was another name for the largest gold coin in Scotland, from the arms of the kingdom upon it. The next was the unicorn, under James III. which were followed by the bonnet-pieces of James V. These last are of admirable workmanship, being almost equal to the ancient coins in this respect. In imitation of the French, the monarch we speak of diminished the size of the coin without lessening its weight; an improvement not adopted by the English for a whole century. The last gold coined in Scotland was the pistole and half pistole, of twelve and six pounds Scots. These coins have the sun under the head. The gold coins of Scotland fell in the same proportion with the silver.

The copper coinage of Scotland is of more early date than that of England. It was preceded by money of billon, or copper washed with silver, called black money. James III. first coined black farthings in 1466; and this is recorded by historians as one of his greatest faults. This kind of coinage, however, continued as late as the reign of James VI In his time the true copper coinage began; but as the value of Scottish money was now declined almost to the utmost, the pieces suddenly assumed a form almost resembling that of the French coins. The bodle, so called from Bothwell the mintmaster, being equal in size to the liard, and worth two pennies Scottish, was struck. The billon coin, formerly called bas-piece, and worth six pennies Scots, was now coined in copper, and termed the baw-bee. Thus it corresponded with the French half sol and English halfpenny, the Scots penny being now equivalent to the French denier. Some pieces named Atkinsons were coined by James VI. in 1582, when the Scottish money was to the English as 1 to 8; but on its being still farther reduced, they went for eight pennies, a third more than the value of the baw-bee. Besides these there were the hardie and plack, the former being worth three and the latter four pennies Scots. This coinage continued through the reigns of Charles I. and II. but Scottish coins of the former are, perhaps, the scarcest of any.

24. Ireland.—The first coins introduced into this kingdom seem to have been those of the Danes, and which have only a number of strokes around them instead of letters. In the tenth century, however, this coinage had been considerably improved; and in 930 and 994 there are pennies struck in Dublin, with the inscription ON DVFLI or DYFLI, *Duflin* or *Dyflin* being the Danish name of that city. There are likewise coins of the Irish princes themselves, and of the English monarchs, struck in Ireland as early as the ninth century; and it is asserted by some, that Ireland even in these days had been conquered by England; of which, indeed, these coins seem to be a proof. None of the Irish coins of Henry II. are to be met with, but we have some of the coins of John; and from his time to that of Henry V. the Irish coins are known by a triangle inclosing the king's head, which appears also upon the coins of other nations at this period. The harp does not appear upon the Irish coins till the time of Henry VIII. Till the time of this monarch, the English and Irish coins are the same; but the same debasement of the coin which at that time took place in England extended also to Ireland; but in 1601 copper halfpence and farthings were coined also for this kingdom. These circulated in Ireland when James VI. issued his farthing tokens of copper, the latter being of two sizes, that if they failed in England they might be sent to Ireland as pennies and halfpence. In 1635 a mint was established in Dublin by Charles I. but it was stopped by the Irish massacre, and the many disturbances which followed; since which time the scheme has not been resumed. After the massacre, St. Patrick's halfpence and farthings were coined by the papists, bearing the legends FLOREAT REX, and on the reverse ECCE GREX; on the farthing QUIESCAT PLEBS. Copper tokens were struck by towns and tradesmen, as in England and Scotland. In 1680, halfpence and farthings were issued by authority, with the harp and date. In 1689, James II. having invaded Ireland, instituted a mint, and coined shillings and half-crowns of all the refuse metal he could find, particularly some brass guns were employed, whence the coinage is commonly called gun-money. Even this metal, however, soon became so scarce, that a diminution in its size is quite apparent from June 1689 to July 1690; and as the month of their mintage is marked upon them, this decrease is easily perceived. In March 1690, pennies of lead mixed with tin were issued; and on the 15th of June the same year, crowns of white metal were coined; but these are now very scarce. In 1722, the patent for coining halfpence and farthings was given to William Wood, which excited such discontent in Ireland. From the small size allowed by the patent to these pieces, it was supposed that the patentee would have gained 60,000l. but as he caused them to be struck of a size still smaller, his gains were estimated at 100,000l. The coins, however, are of admirable workmanship, and very fine copper, bearing the best portrait of king George I. to be found any where. Sir Isaac Newton, at that time at the head of the mint, declared that they were superior to the English coins in every thing except the size. In 1737 the Irish halfpence and farthings, with the harp on the reverse, were coined, and continue to the present time. In 1760 there was such a scarcity of copper coin, that some private persons applied for leave to coin halfpence, which appeared with a very bad portrait of George II. and the words VOCE POPULI around it. No gold or silver has been coined in Ireland since the massacre of 1641.

TABLE V. *Modern medals, properly so called.*

1. Scottish medals.—These take the lead in the present article, the first modern medals of gold being those of David II. struck between the years 1330 and 1370. Only two of them now exist; one in the collection of Mr. Barker of Birmingham, and the other in that of Dr. Hunter.

In 1478 there is a medal of James III. sent to the shrine of St. Ambroise in France. It is described as of two inches and a third in diameter; the weight near two ounces; having on the obverse a beardless king, with long hair, sitting on a throne, holding in one hand a naked sword; in the other a shield, with the Scottish arms. On the borders of the canopy above the throne is an inscription in Gothic letters, IN MI DEFFEN, being corrupt French for *In my defence*; a common motto in the Scottish arms. Above the canopy is VILLA BERWICI: the reverse bears St. Andrew and his cross, SALVUM FAC POPULUM TUUM, DOMINE. There is also a medal of James IV. in the collar of St. Michael, having on the reverse a Doric pillar surmounted by a young Janus, standing on a hill, beyond which is the sea, and land on either side. This, however, is by some suspected to be a forgery.

The most remarkable Scottish medals are those of the unfortunate Mary. The first is properly French, having been issued at her coronation as queen of France, along with her husband king Francis II. On the obverse of this piece there are portraits of Francis and Mary, face to face, with three legends around them, the outermost containing their titles; the middle one the following sentence: HORA NONA DOMINUS J. H. S. EXPIRAVIT HELI CLAMANS; the innermost the name of the city (Paris). On the reverse are the arms of France and Scotland. Fine testoons were also coined upon the same plan, and are now so rare that Dr. Hunter gave ten guineas for one he had in his collection. The same portraits appear on the fine crown of Mary and Henry, in 1565, which is so rare as to be esteemed a medal of the highest value; and Mr. Pinkerton imagines, that if brought to a sale it would bring 40 or 50 guineas.

Another remarkable medal of Mary represents her full faced, and weeping, with the inscription, O GOD GRANT PATIENCE IN THAT I SUFFER VRANG. The reverse has in the centre, QUHO CAN COMPARE WITH ME IN GRIEF? I DIE AND DAR NOCHT SEEK RELIEF; with this legend around, HOURT NOT THE (figure of a heart) QUHAIS JOY THOU ART. There are also many counters of this unfortunate princess, being thin silver pieces of the size of a shilling. "They all appear (says Mr. Pinkerton) to have been done in France by Mary's direction, who was fond of devices. Her cruel captivity could not debar her from intercourse with her friends in France, who must with pleasure have executed her orders, as affording her a little consolation."

The coronation medal of Charles I. struck at Edinburgh for his inauguration, June 18, 1663, is remarkable, as being the only one ever coined of Scottish gold, and the first in Britain struck with a legend on the edge. With respect to the workmanship, it is inferior to Simon's. Of these medals only three are known to exist, of which one is in the Museum. It is not uncommon in silver; in which case it sometimes wants the legend on the edge.

2. Italian medals.—These appear in the 15th century, and from that time successively in most European countries. Vittore Pisano, a painter of Verona, is celebrated as the restorer of the art; but it remains to be accounted for how the medals of king David already mentioned came to exist so long before. Mr. Pinkerton considers this artist rather as an inventor than a restorer, his medals having no resemblance to the ancient coins, as being large, and all cast. They were first modelled in wax, then a mould taken from the model in fine sand, and other ingredients. After a good cast was procured, it was touched up, and made a model for the rest. These medals of Pisano are almost always inscribed *Opus Pisani Pictoris*. The portraits of a great number of illustrious men were done by him in this manner; and in the British Museum is a large brass medal of Pisano himself.—Other artists were Boldu, Marescotto, Matthæus de Pastus, Sperandes, Misaldone, &c. Towards the end of the century, however, the medals began to assume a more elegant appearance; and the papal ones are not only the most elegant but the most ancient series of all the modern medals. The improvement began in the reign of Alexander VI. so famous for his own crimes, and those of his nephew Cæsar Borgia. His successors, Julius II. Leo X. Hadrian VI. and Clement VII. had many of their medals designed by Raphael, Julio Romano, and other eminent painters, and the engraving executed by artists of equal merit. Among these were the celebrated Cellini, and the noted Paduan forgers of Roman coins, Cavino and Bassiano. In 1644 Cormanni, a medallic artist, was imprisoned on account of a piece which represented the Pope upon one side, and Olympia Maidalchina, the relation of his holiness, on the other. The unfortunate Cormanni poisoned himself. About this time the family of the Hamerani, originally from Germany, began to engrave the papal medals; which they did with surprising merit for several generations. Each of the daughters did a fine medal, as we are informed by Venuti.

Besides the papal medals, there are many issued by the various states of Italy. There are medals of Frederic II. of Sicily in 1501, of several Venetian generals in 1509, of Alfonso duke of Ferrara in 1511, and of the celebrated Andrew Doria in 1528.

3. French medals.—Till the reign of Louis XIV. the medals of this country are neither fine nor numerous; but this monarch exceeds all modern princes in this way. Many of his pieces are well designed and executed, though objectionable on account of their falsehood.

4. Danish medals.—These appear of Christian II. in 1516, of Frederic and Sophia in 1532, of Frederic I. and Christian III. in bonnets worn in the sixteenth century. The elephant of the house of Oldenburgh is frequent upon Danish medals.

5. Swedish medals.—These begin with Gustavus Vasa; and several of Christina are likewise to be met with. There are also some curious ones of Charles XII.

6. Dutch medals.—These begin in 1566; and many of them are remarkable for maps and plans, which must be very interesting to posterity. "Had the Greeks and Romans (says Mr. Pinkerton) given us maps and plans, what a fine system of ancient geography and topography a cabinet of medals must have been!"

7. Medals of Spain, Portugal, and Germany.—The Spanish medals begin with Gonsalo in 1503; many of which are curious and interesting. Under Charles V. there are many curious Spanish medals, but those in Germany begin with Frederic in 1453. They are extremely numerous; as we may easily suppose from the greatness of the empire, and the various states which compose it. There is a famous medal of Sebastian king of Portugal, famous for his unfortunate expedition into Africa in 1578; with his bust, full face, and three quarters in

length. On the reverse is a shell-fish in the sea, with the moon and seven stars, bearing the inscription SERENA CALSA FAVENT. There is also a curious lozenge-shaped coin of the same with the arms of Portugal, and the king's name and title: On the reverse is a cross with the inscription IN HOC SIGNO VINCES, 1578.

8. Satiric medals.—These began almost as soon as the knowledge of the art of coining medals was revived. They seem to have been almost unknown to the ancients. One indeed of the emperor Gallienus is supposed to have been satiric. It has on the front the emperor's bust, with the inscription GALLIENÆ AUG. the reverse is Peace in a car, PAX UBIQUE; but this has been proved to be only a blundered coin. Some other ancient medals, however, are not liable to this objection. The first modern satiric medal published was that of Frederic king of Sicily in 1501, against his antagonist Ferdinand king of Spain. It has on one side the head of Ferdinand with the inscription FERDINANDUS R. AR. VETUS VULPES ORBIS; on the reverse a wolf carrying off a sheep, JUGUM MÆUM SUAVE EST, ET ONUS MEUM LEVE. Many others have been struck, of which the wit would now perhaps be difficult to be found out: but of all nations the Dutch have most distinguished themselves in this way; and paid very dear for their conduct, as they brought upon themselves by one or two satiric medals the whole power of France under Louis XIV.

9. English medals.—The first of these is in the duke of Devonshire's collection. It is of a large size, and done on the plan of the early Italian medals. It has on the reverse the arms of Kendal, with the inscription TEMPORE OBSIDIONIS TURCORUM, MCCCCLXXX. On the other side is a portrait with IO. KENDAL RHODI TURCUPELLERIUS. It was found last century in Knaresborough forest; but Mr. Pinkerton has no doubt of its having been done in Italy. The next is that of Henry VIII. in 1545, and is of gold, larger than the crown-piece, with the king's head upon the obverse, and three legends within each other, including his titles, &c. The reverse contains two inscriptions, declaring him to be the head of the church; the one in Hebrew, the other in Greek. It was imitated exactly by Edward VI. whose coronation medal is the first we have. There are two medals of Philip and Mary, whose execution is tolerably good; but those of Elizabeth are very poor. There are good medals of James I. and his queen; with a fine one of Charles I. and Henrietta, though the workmanship is much inferior to the antique. There are many good medals of Charles, with various devices upon their reverses. Under the commonwealth the celebrated Simon produced medals which are deservedly reckoned the most admirable pieces of modern workmanship. There are many good medals of Charles II. James II. and William III. Some are also found of James after his abdication. Some fine gold, silver, and copper medals, were issued in the time of queen Anne; the two last affording a series of all the great actions of the duke of Marlborough. About the year 1740, a series of medals was engraved in London by Dassier, a native of Geneva, containing all the kings of England; being 36 in number. They are done upon fine copper, and executed with great taste. There are besides many medals of private persons in England; so that it may justly be said, that this country for medals exceeds almost every other in Europe.

To this account of modern coins and medals we shall add that of another set called *siege-pieces*, and which were issued during the time of a siege in cases of urgent necessity. These were formed of any kind of metal; sometimes of no metal, and Patin mentions a remarkable one struck at Leyden in 1574, when the place was besieged by the Spaniards. It was of thick paper or pasteboard, having a lion rampart, with this inscription, PUGNO PRO PATRIA, 1574; and on the reverse, LUGDUNUM BATAVORUM. There are various siege-pieces of Charles I. both in gold and silver, some of the latter being of the value of twenty shillings.

The *nummi bracteati* are a species of modern coins somewhat between counters and money; and have their name from the word bractea, a spangle or thin bit of metal. They are commonly little thin plates of silver, stamped as would seem with wooden dies upon one side only, with the rude impression of various figures and inscriptions. Most of them are ecclesiastic, and were struck in Germany, Switzerland, Denmark, Sweden, Norway, and a few in Poland. They continued to be in use in Germany till the end of the fifteenth century, and some are still used in Switzerland at this day.

Table of Abbreviations used in the Legends of Medals; from Mr. Pinkerton.

Greek Coins.

A

A. Athens, Argos, Aulus, Asylum; primi or first; as Εφεσιων Α Ασιας, "Ephesians, first people of Asia"
A. Abbassus, Abdera, Abydus on Hellespont
AB. Abydus in Egypt
ABΥ. Abydus on Hellespont
AΘ. AΘE. Athens
AIΓ. Aegina
AIΓOΣΠO. Aigospotamos
AIA. Aelius, Aelia Capitolina
AIN. Aenos
AK.—AKPAΓAN. Agrigentum
AKI. Acilium
AKT. Actium
AΛE. Alexandria
AM. Amyntas
AMBP. Ambracia
AMΦI. Amphilochia
ANΘ. Ανθυπατου, Proconsul
ANTIΣ. Antissa
ANA. Anactoria
ANTI. Antium
AN. Ancyra
ANT. Antoninus, Antioch
AΞ. Axus in Crete
AON. Aonitæ
AOΥE. Avenio, *Pell.*
AΠ. Appius
AΠA. Apamea
AΠO. Apolonia
AΠTA. Aptara
AP. Aradus, Harma
APΓE. Argennos
APΓ. Argos
API. Aricanda
APIM. Ariminum
APΣI. Arsinoe
APΥ. Aryca
APX. Αρχιερευς or Αρχων, high priest or magistrate
AΣIAPX. Asiarchæ, presidents of the games of Asia*

* There were also Syriarchæ, Lyciarchæ, Galatarchæ, Bithyniarchæ, Cappadociarchæ, &c. *Morel. Spec.*

MEDALS.

ΑΣ. Asylum
Α. Σ. Πρωτη Συριας, First of Syria
ΑΣΚ. Ascalon
ΑΤ. Atabyrium
ΑΤΑΡ. Atarnæ
ΑΥΓ. Augustus
ΑΥΡΗΛ. Aurelius
ΑΥ. ΑΥΤ. Αυτοκρατωρ, Emperor
ΑΥΤΟΝ. Αυτονομοι, enjoying their own laws
ΑΦΙ. Aphyta
ΑΦΡ. Africanus
ΑΧ. Achaii

B

Β. Βουλης, Council: Berytus Bithynia
ΒΑΓΗΔΑΟ. Bagadaonia
ΒΑΛ. Valerius
ΒΗ. Berytus
ΒΙΤΟΝ. Bitontum
ΒΟΙ. Bœotia
ΒΡΥΝ. Brundusium
ΒΥ. Byzantium

Γ

Γ. ΓΡ. ΓΡΑΜ. Grammaticus, or keeper of the records
Γ. Gaius, or Caius
ΓΑ. Gallus, Galerius, Gallienus
Γ. Γνωριμον, Illustrious
ΓΕΛ. Gelas
ΓΕΡ. Germanicus
ΓΝ. Gneius
ΓΟΡΤΥ. Gortyna
ΓΡΑ. Gravisca

Δ

Δ. Decimus, Dymæ
ΔΑΚ. Dacicus
ΔΑΜ. Damascus
ΔΑΡ. Dardanum
ΔΗ. Δημος, the people
ΔΗΜΑΡΧ. ΕΞΟΥΣ. with Tribunitian power
ΔΕ. Decelia
ΔΕΚ. Decius
ΔΕΡ. Derbe in Lycaonia
ΔΗ. Delos
ΔΙ. Diospolis
ΔΡΕ. Drepanum
ΔΥΡ. Dyrrachium

Ε

Ε. Eryce
Ε. ΕΡΕΣ. Eresus
ΕΛΕΥ. Eleusis
ΕΛΕΥΘ. Ελευθερα, Free
ΕΠΙ. Epidaurus
ΕΡΙ. Eriza in Caria
ΕΡΧ. Erchia
ΕΡΥ. Erythræ
ΕΤ. ΕΤΟ. Ετους, Year
ΕΤ. Etenna in Pamphylia
ΕΧ. Εχουσια, Power
ΕΥ ΕΥΒΟ. Eubœa
ΕΥΣ. Ευσεβης, Pious
ΕΥΤ. Ευτυχης, Happy
ΕΦ. ΕΦΕ. Ephesus

Ζ

ΖΑ. Zacynthus
ΖΑΝΚΛ. Zancle, Messana anciently so called

H

Η. Elium
ΗΓ. Ηγεμονος, President
ΗΡΑΚ. Heraclea

Θ

ΘΑ. Thasus
ΘΕ. Thespiæ
ΘΕΣ. Thessalonica
ΘΗ. ΘΗΒ. Thebæ

I

Ι. ΙΕΡ. Ιερας, Sacred
ΙΕΡΑΠΥ. Hyerapytha
ΙΚΑΡ. Hiccara
ΙΛΙ. Ilium
ΙΟΥ. Iulis a city, or Julius
ΙΟΥΛ. Julia
ΙΠΑ. Hippana
ΙΡ. Irene Ins. *Pellerin.*
ΙΣ. Isus, Istiæa

K

Κ. Caius; Κοιντος, Quintus
Κ. ΚΑΙΣ. Cæsar
Κ. Κ. Κοινον Κιλικιας, Community of Cilicia
ΚΑΙΛ. Cælius
ΚΑΛ. Chalcedon
ΚΑΛΛΙ. Callipolis
ΚΑΜΑ. Camara
ΚΑΝ. Canata
ΚΑΠ. Capua
ΚΑΠΠ. Cappadocia
ΚΑΡ. Carrhæ
ΚΑΡΓ. Carthago
ΚΑΥ. Caulonia
ΚΕ. Ceos
ΚΕΦ. Cephalœdis
ΚΙ. Cianus, Cibyrum
ΚΙΛ. Cilbiani
ΚΛ. Cleonæ, Claudius
ΚΛΑ. Clazomenæ
ΚΝΙ. Cnidus
ΚΟ. Corinth
ΚΟΙΝ. Κοινον, Community
ΚΟΛ. Κολωνιας, Colony, Colophon
ΚΟΜ. Commodus
ΚΟΡ. Corcyra
ΚΡ. Cragus in Lycia
ΚΡΑ. Cranos
ΚΡΗ. Crete
ΚΤΗ. Ctemenæ, *Pell.*
ΚΥ. Cuma, Cydonium, Cyon
ΚΥΘ. Cythnus
ΚΥΠ. Cyprus
ΚΥΡ. Cyrene

Λ

... or L. Λυ... αντος, Year

ΛΑ... edæmon
... mea, Lampsacus
... issa
... Lennum
... ΛΕ... ucheas
... ΟΝ. ... tium
ΛΗΜ. Le... s
ΛΙΠ. Lipar...
ΛΥΓ. Lyic...olis
... ΩΚ. Locri
ΑΟ... ...agone
ΛΥ... ΛΥΚ. Lyctus

M

Μ. Marcus, Malea, Megalopolis, Mazaka
ΜΑ. Maronea, Massilia, Macedonia
ΜΑΓ. Magnesia
ΜΑΚΡΟ. Macrocephali
ΜΑΜ. Mamertini

ΜΑΣΣ. Massilia
ΜΑΖ. Mazara
ΜΕ. Menelais, on Syrian regal coins
ΜΕΝΕΚ. Menecrates
ΜΕ. ΜΕΓ. Megara, Megalopolis, Melite
ΜΕΓ. Μεγαλης, Great
ΜΕΣ. Messana
ΜΕΤΑ. Metapontum
Μ. ΜΗΤΡΟ. Metropolis
ΜΙ. Miletus
ΜΚ. Mazaka of Cappadocia, on coins of Mithridates VI.
ΜΟΡ. Morgantia
ΜΥ. Mycenæ
ΜΥΡ. Myrlea,
ΜΥΤΙ. Mytilene

N

Ν. Naupactos
ΝΑΞ Naxos
ΝΑΥΑΡΧ. Ναυαρχιδος, enjoying a sea-port
ΝΕ. Nemea
Ν. ΝΕΩΚ. Neocori
ΝΕΟΠ. Neopolis
ΝΕΡ. Nerva
ΝΙΚ. Nicæum, Nicomedia
ΝΥΣ. Nysæi, or coins of Scythopolis, *Pell.*

O.

ΟΙ. Oethæi
ΟΝ. Οντος, being
ΟΠΕΛ. Opelius
ΟΠ. Opus
ΟΡΥ. Orycus
ΟΡΧ. Orchomenus
ΟΥΠ. or ΥΠ. Ουπατος or Υπατος, Consul
ΟΥΕΡ. Verus
ΟΥΗ. Vetus
ΟΥΕΣΠ. Vespasianus
ΟΥΙΤΕΛ. Vitellius
ΟΦΡΥ. Ophrynium

Π

Π. Παρα, Προς, upon
Π. ΠΟΠΛ. Publius
Π. ΠΑ. Paphos or Paros
ΠΑΙΣ. Pæstum
ΠΑΝ. Panarmus
ΠΑΡ. Paropinum
ΠΑΡΙ. Paros
ΠΑΡΘ. Parthicus
ΠΕ. Perinthus
ΠΕΛ. Pella
ΠΕΡ. Pergus
ΠΕΡΤ. Pertinex
ΠΕΣΚ. Pescennius
Π. ΠΗ. Pelusium
ΠΙΝ. Pinamytæ
ΠΛΑ. Platetæ
ΠΟ. Pontus
ΠΟΛΥ Polyrrhenum
ΠΟΣ. Posidonia
ΠΡΑΣ. Prassus
Π. ΠΡΥ. Πρυτανευς, Præfect
ΠΡ. ΠΡΕΣ. Πρεσβευς, Legate
ΠΡΟ. Proconnesus
ΠΡΟΔΙ. Προδικος, Curator
Π. ΠΡΩΤ. Πρωτος, First
ΠΤ. Ptolemais
ΠΥ. Pylos

Ρ

ΡΟ. Rhodes

Σ

Σ. ΣΑ. Salamis, Samos, Syria
ΣΑ. Samosate
ΣΑΛΑΠ. Salapia
ΣΑΡ. Sardis
ΣΕ. Seriphus, Segeste
ΣΕΒ. Σεβαστος, Augustus
ΣΕΛ. Selinus, Seleucia
ΣΕΠΤ. Septimius
ΣΙ. Siphnos
ΣΙΔ. Side
ΣΙΝΩ. Sinope
ΣΜΥ. Smyrna
ΣΤΡ. ΣΤΡΑ. Στρατηγος, Prætor
ΣΥΒ. Sybaris
ΣΥ. ΣΥΡΑ. Syracuse
ΣΥΡ. Syria
ΣΩ. Solæ

T

Τ. Titus
ΤΑΒΑΛ. Tabala
ΤΑ. ΤΑΝΑ. Tanagra
ΤΑΡ. Tarentum, Tarsus
ΤΑΥΡ. Tauromenum
ΤΕ. Tementis
ΤΕΡ. Terina
ΤΗ. Tenus
ΤΙ. ΤΙΒ. Tiberius
ΤΡΑ. Trallis
ΤΡΙ. Tripolis
ΤΡΟ. Troizene
ΤΥΑΝ. Tyana
ΤΥ. Tyndaris
ΤΥΡ. Tyre (monogram)

ΥΕ. ΥΕΛ. Velia
ΥΠ. ΥΠΑΤ. Υπατος, Consul

Φ. Philip; Phœstus, Philuntium
ΦΑ. Phaselis
ΦΑΡ. Pharsalus
ΦΙ. Vibius, Philippopolis
ΦΙΝΕ. Phineium
ΦΛ. Flavius
ΦΚ. Phocæum
ΦΟΥΛ. Fulvia
ΦΥ. Phycus in Cyrene

X

Χ. Chios
ΧΑΛ. Chalcis
ΧΕΡ C[illegible]ersonesus
ΧΙ[illegible] [illegible]tri in Crete.

Greek Numerals.

[illegible]	[illegible]	Ι	10.	Ρ.	100.
Β	2.	Κ.	20.	Σ. or C	200.
Γ	3	Λ.	30.	Τ.	300.
Δ.	4	Μ.	40.	Υ.	400.
Ε.	5.	Ν.	50.	Φ.	500.
[illegible]	[illegible]	Ξ.	60.	Χ.	600.
[illegible]	7	Ο.	70.	Υ.	700.
Η	8.	Π.	80.	Ω.	800.
[illegible]	9.	q or q	90.	q.	900.

Examples. I is 10: add A to I, and IA makes 11: so IB, 12; IΓ, 13, &c. K is 20, KA, 21, &c. PIA makes 111. The English word AIR marks the grand initial numerals. On coins the numerals are often placed in retrograde order; which makes no difference in the value, as every letter is appropriated to its number. Thus ΤΛΓ or ΓΛΤ imply the same, 333. But this advantage being unknown

to the Roman numerals and Arabic ciphers, is apt to puzzle the beginner.

Roman Coins.

A

A AVLUS: in the exergue it implies the first mint, as ANT. A, coined at Antioch in the first mint.
A. A. A. F. F. Auro, Argento, Ære, Flando, Feriundo
A. or AN. Annus
A. A. Apollo Augusti
A. F. A. N. Auli filius, Auli nepos
ABN. Abnepos
ACT. Actiacus, or Actium
AD. FRV. EMV. Ad fruges emundas
ADIAB. Adiabenicus
ADOP. Adoptatus
ADQ. Adquisita
ADV. Adventus
AED. Ædes
AED P Ædilitia protestate
AED. S Ædes sacræ
AED. CVR. Ædilis Curulis
AED. PL. Ædilis Plebis
AEL Ælius
AEM. or AIMIL. Æmilius
AET. Æternitas
AFR. Africa, or Africanus
ALBIN. Albinus
ALIM. ITAL. Alimenta Italiæ
ANN. AVG. Anno Augusti
A. N. F. F. Annum Novum Faustum Felicem
ANIC. Anicius
ANN DCCCLXIIII. NAT. VRB. P CIR. CON. Anno 864. Natali Urbis Populo Circenses constituti
ANT. AVG Antonius Augur
ANT Antonius, or Antoninus
AP. Appius
A. P. F Argento Publico Feriundo
A. POP. FRVG. AC. A Populo Fruges Acceptæ
AQ. or AQL. Aquilius
AQVA MAR. Aqua Martia
ARAB. ADQ Arabia Adquisita
ARR. Arrius
AVG. Augur, Augustus, Augusta
AVG. D. F. Augustus Divi Filius
AVGG. Two Augusti
AVGGG Three Augusti
AVR. or AVREL. Aurelius

B

B. The mark of the second mint in any city
BON EVENT. Bonus Eventus
B. R. P. NAT. Bono Reipublicæ Nato
BRIT. Britannicus
BRVT. Brutus.

C. Caius, Colonia
C. A. Cæsarea Augusta
C. CAE. or CAES. Cæsar
CAESS. Cæsares
CARTH. Carthage
CEN. Censor
CENS. P. Censor Perpetuus
CEST. Cestius, or Cestianus
CIR. CON. Circum Condidit, or Circenses Concessit.
CIVIB ET. SIGN. MILIT. A. PARTH. RECVP. Civibus et Signis Militaribus a Parthis Recuperatis
CN. Cneius
COEL. Cœlius
CON. OB. Constantinopoli Obsignata; or Constantinopoli Officina secunda, or Conflata Obryzo
COL. Colonia
CON. SVO. Conservatori suo
CONCORD. Concordia
CL. V. Clypeus Votivus
COMM. Commodus
CLOD. Clodius
CL. or CLAVD. Claudius
COS. Consul
COSS. Consules
CORN. Cornelius
CVR. X. F. Curavit Denarium Faciendum

D

D. Decimus, Divus, Designatus
DAC. Dacicus
D. F. Dacia felix
D. M. Diis Manibus
DES. or DESIG. Designatus
DICT. Dictator
DOMIT. Domitianus
D. N. Dominus noster
DID. Didius
D. P. Dii Penates
DV. Divius

E

EID. MAR. Idus Martiæ
EX. CONS. D. Ex Consensu Decurionum
EX. S. C. Ex Senatus Consulto
EQ. ORDIN. Equestris Ordinis
EX. A. PV. Ex Argento, or Auctoritate Publica
EXER. Exercitus
ETR. Etruscus

F

F. Filius, or Filia, or Felix, or Faciundum, or Fecit
FEL. Felix
FELIC. Felicitas
FL. Flavius
FLAM. Flamen
FORT. RED. Fortunæ Reduci
FOVRI. Fourius for Furius
FONT. Fonteius
FRVGIF. Frugiferæ (Cereri)
FVL. Fulvius
FVLG. Fulgerator

G

G. Gneius, Genius, Gaudium
GA. Gaditanus
G. D. Germanicus Dacicus
GEN Genius
GERM. Germanicus
GL. E. R. Gloria Exercitus Roman
GL. P. R. Gloria Populi Romani
GOTH. Gothicus
G. P R. Genio Populi Romani
G. T. A. Genius Tutelaris Ægypti, or Africæ

H

HEL. Helvius
HEL. Heliopolis
HER. Herennius, or Herennia
HO. Honos
HS. Sestertius

I

I. Imperator, Jovi, Julius
IAN. CLV. Janum clusit for clausit
IMP Imperator
IMPP. Imperatores
I. S. M. R Juno Sospita, Mater or Magna Regina
IT. Italia, Iterum

ITE. Iterum
IVL. Julius or Julia
IVST. Justus
I. I. S. Sestertius
I. O. M. SACR. Jovi Optimo, Maximo, Sacrum
II. VIR. Duumvir
III. VIR. R. P. C. Triumvir Reipublicæ Constituendæ
IIII. VIR. A. P. F. Quatuorvir, or Quatuorviri, Auro, or Argento, or Ære, Publico Feriundo
IVN. Junior

L

L. Lucius
LAT. Latinus
LEG. PROPR. Legatus Proprætoris
LEG. I. &c. Legio Prima, &c.
LEP. Lepidus
LENT. CVR. X. F. Lentulus Curavit Denarium Faciundum
LIBERO P. Libero Patri
LIB. PVB. Libertas Publica
LIC. Licinius
L. S. DEN. Lucius Sicinius Dentatus
LVC. Lucifera
LVD. CIR. Ludi Cercenses
LVD. EQ. Ludi Equestres
LVD. SAEC. F. Ludos Sæculares Fecit

M

M. Marcus, or Marius
MAR. CL. Marcellus Clodius
M. F. Marci Filius
M. OTACIL. Marcia Otacilia
MAG. or MAGN. Magnus
MAC. Macellum
MAX. Maximus
MAR. Martia (aqua)
MAR. VLT. Marti Ultori
MES. Messius
METAL. Metallum
MINAT. Minatius
MINER. Minerva
M. M. I. V. Municipes Municipii Julii Uticensis
MON. or MONET. Moneta

N

N. Nepos or Noster
N. C. Nobilissimus Cæsar
NAT. VRB. Natalis Urbis
NEP. Nepos
NEP. RED. Neptuno Reduci

O

O. Optimo
OB. C. S. Ob Cives Servatos
OF. Officina
OPEL. Opelius
ORB. TERR. Orbis Terrarum

P

P. or POT. Potestate
PAC. ORB. TER. Pacatori Orbis Terrarum
PAPI. Papius or Papirius
PARTH. Parthicus
PERP. Perpetuus
PERT. or PERTIN. Pertinax
PESC. Pescennius
P. F. Pius Felix
PLAET. Plætonius
P. L. N. Pecunia Londini Notata
P. LON. S. Pecunia Londini Signata
P. M. or PONT. MAX. Pontifex Maximus
POMP. Pompeius
P. P. Pater Patriæ
PR. Prætor
P. R. Populus Romanus
PRAEF. CLAS. ET ORAE MARIT. Præfectus Classis et Oræ Maritimæ
PRINC. IVVENT. Princeps Juventutis
PRIV. Privernum
PROC. Proconsul
PRON. Pronepos
PROP. Proprætor
PROQ. Proquæstor
PROV. DEOR. Providentia Deorum
PVPIEN. Pupienus

Q

Q. Quintus, or Quæstor
Q. C. M. P. I. Quintus Cæcilius Metellus Pius Imperator
Q. DESIG. Quæstor Designatus
Q. P. Quæstor Prætorius
Q. PR. Quæstor Provincialis

R

R. Roma, Restituit
RECEP. Receptis, or Receptus
REST. Restituit
ROM. ET. AVG. Romæ et Augusto
R. P. Respublica

S

SAEC. AVR. Sæculum Aureum
SAEC. FEL. Sæculi Felicitas
SAL. Salus
SALL. Sallustia
SARM. Sarmaticus
S. C. Senatus Consulto
SCIP. ASIA. Scipio Asiaticus
SEC. ORB. Securitas Orbis
SEC. PERP. Securitas Perpetua
SEC. TEMP. Securitas Temporum
SEN. Senior
SEPT. Septimius
SER. Servius
SEV. Severus
SEX. Sextus
SIC. V. SIC. X. Sicut Quinquennalia, sic Decennalia
SIG. Signis
S. M. Signata Moneta
S. P. Q. R. Senatus Populusque Romanus
STABIL. Stabilita (terra)
SVL. Sulla

T

T. Titus, Tribunus
TER. Terentius, or Tertium
TEMP. Temporum
TI. Tiberius
TR. or TREV. Treveris
TREB. Trebonianus
TR. MIL. Tribunis Militaris
TR. P. or TRIB. POT. Tribunitia Potestate.

V

V. Quintum
V. C. Vir Clarissimus
VESP. Vespacianus
VIB. Vibius
VICT. Victoria
VII. VIR. EPVL. Septemvir Epulonum
VIL. PVB. Villa Publica
VIRT. Virtus
VN. MR. Venerandæ Memoriæ
VOT. X. MVLT. XX. Votis Decennalibus Multiplicatis Vicennalibus

X, Decem, Denarius
XV. VIR. SACR. FAC. [illegible]ium Vir Sacris Faciundis.

Abbreviations in the Exergue; from Banduri and [illegible]. Pinkerton.

A. Officina Prima
ALE. Alexandria
AMB. Antiochensis Moneta Secundæ Officinæ
AN. ANT. ANTI. Antiochia
ANB. Antiochiæ Secunda Officina: to ANH. Antiochiæ Octava Officina
A. P. L. (In officina) Prima percussa Lugduni
AQ. AQL. Aquileiæ
AQ. O. B. F. Aquileiæ Officinæ Secundæ Fabrica
AQ. P. S. Aquileiæ Pecunia Signata
AQ. S. Aquileiæ Signata
A. AR. ARL. Arelate
A. SISC. Prima (in officina) Sisciæ
B. SIRM. Secunda Sirmii
B. S. L. C. Secunda Signata Lugduni
C. Θ. Constantinopoli Nona
COMOB. Conflata Moneta Obryzo. Only on gold or silver from a gold dye
CON. Constantinopoli
CONOB. Conflata Obryzo. Only on gold
CONS. Constantinopoli
KART. Carthago
K. O. Carthaginensis Officina
L. LC. LVC. LVG. Lucduni, Lugduni
L. LON. Londini
L. P. Lugdunensis vel Londinensis Pecunia
LVC. P. S. Lugduni Pecunia Signata
MDPS. Mediolani Pecunia Signata
M. K. V. T. Moneta Kartaginensis Urbis (in officina) Tertia
M. L. Moneta Lugdunensis vel Londinensis
MOSTT. Moneta Officinæ Secundæ Treverorum
MSTR. Moneta Signata Treveris
O. Officina
OFF. III. CONST. Officina Tertia Constantinopoli
PARL. Percussa or Pecunia Arelate
PLON. Pecunia Londinensis
PLVG. Pecunia Lugdunensis
P. R. Pecunia Romana, or Percussa Romæ
P. T. Pecunia Treverensis
Q. AR. Quincta Arelatensis (officina)
R. RO. ROM. Romæ
RA. Ravennæ
ROPS. Romæ Pecunia Signata
S. AR. Signata Arelate
S. CONST. Signata Constantinopoli
SIS. Sisciæ
SS. P. Siscienses Pecunia
SISC. V. Siscia Urbs
SMA. Signata Moneta Antiochiæ
S. M. HER. Signata Moneta Heracleæ
S. M. N. Signata Moneta Nicomediæ
S. M. R. Signata Moneta Romæ
S. T. Signata Treveris
TESOB. Tessalonicæ Officina Secunda
THEOP. Theopoli
TR. Treveris Officina Secunda

Explanation of Plates 104 *and* 105.

Fig.
1. A Persian Daric
2. A drachm of Egina
3. A silver hemidrachm of Alexander the Great
4. Tigranes the younger of Armenia, with his sister
5. One of the coins of the Arsacidæ of Parthia
6. A coin of the Sassanidæ of Persia. First published by Mr. Pinkerton
7. Denarius of Cneius Pompey from Mr. Pinkerton, reverse. Received by Spain
8. A silver coin of Carausius
9. A brass coin of Cunobelinus
10. Pescennius Niger. Struck at Antioch; unique. In Dr. Hunter's cabinet; published by Mr. Pinkerton
11. Reverse of Claudius in first brass
12. Twenty ancient pennies (probably Scotch)
13. A Saxon penny
14. A reverse of Maximian I. in third brass. The same reverse occurs of Diocletian, Severus Cæsar, and Constantine I.
15. A Saxon styca
16. Reverse of Adrian
17. Of Antoninus Pius
18. Of Commodus
19. Of Severus
20. The ryal of queen Mary of Scotland
21. A penny of William of Scotland
22. A penny of Robert the Great
23. An Irish penny
24. The gold penny of Henry III.
25. The large noble of the first coinage of Edward III.
26. A reverse of Commodus in first brass, from Dr. Hunter's cabinet. The Apollo Monetæ was the deity of art and elegant design in coinage

MEDA'LLIC. *a.* Pertaining to medals.

MEDALLION, or MEDALLON, a medal of an extraordinary size, supposed to be anciently struck by the emperors for their friends, and for foreign princes and ambassadors. But, that the smallness of their number might not endanger the loss of the devices they bore, the Romans generally took care to stamp the subject of them upon their ordinary coins. Medallions, in respect of the other coins, were the same as modern medals in respect of modern money; they were exempted from all commerce, and had no other value than what was set upon them by the fancy of the owner. Medallions are so scarce, that there cannot be any set made of them, even though the metals and sizes should be mixed promiscuously.

ME'DALIST, *s.* (*medailliste*, French.) A man skilled or curious in medals (*Add.*).

To ME'DDLE. *v. n.* (*middelen*, Dutch.) 1. To have to do (*Bacon*). 2. To interpose; to act in any thing (*Dryden*). 3. To interpose or intervene importunely or officiously (*Proverbs*).

To ME'DDLE. *v. a.* (from *mesler*, French). To mix; to mingle: obsolete (*Spenser*).

ME'DDLER. *s.* (from *meddle*.) One who busies himself with things in which he has no concern (*Bacon*).

ME'DDLESOME. *a.* Intermeddling (*Ainsworth*).

MEDE (Joseph), a learned divine, was born in 1586, at Berden in Essex, and in 1602 went to Christ's College, Cambridge, where he studied with intense application, and, on taking his degree of M. A. was chosen fellow. He refused several preferments, particularly the provostship of Trinity College,

Cambridge, which was repeatedly offered him by archbishop Usher. He died in 1638. All his works have been collected into one volume folio. His Comments on the Apocalypse are by far the best of his writings, and his system in explaining that mysterious book has been followed by some of our greatest modern divines.

MEDEA, in fabulous history, a celebrated sorceress, daughter of Æetes, king of Colchis. She was the niece of Circe. When Jason came to Colchis in quest of the golden fleece, Medea became enamoured of him, and it was to her labours that the Argonauts owed their preservation. (See JASON and ARGONAUTÆ.) Medea had an interview with her lover in the temple of Hecate, where they bound themselves by the most solemn oaths, and promised eternal fidelity. No sooner had Jason overcome all the difficulties which Æetes had placed in his way than Medea embarked with the conquerors for Greece. To stop the pursuit of her father, she tore to pieces her brother Absyrtus, and left his mangled limbs in the way through which Æetes was to pass. When Jason reached Iolchos, the return of the Argonauts was universally celebrated; but Æson, the father of Jason, was unable to assist at the solemnity, on account of the infirmities of his age. Medea, at her husband's request, removed the weakness of Æson, and by the juice of certain herbs restored him to the vigour of youth. Her conduct, however, to the daughter of Pelias, and her refusal to bring Pelias to life after they boiled his flesh in a cauldron, greatly irritated the people of Iolchos, and Medea, with her husband, fled to Corinth, to avoid the resentment of an offended populace. Here they lived for ten years, but the love of Jason for Glauce, the king's daughter, soon interrupted their mutual harmony, and Medea was divorced. Medea revenged the infidelity of Jason by causing the death of Glauce, and the destruction of her family. (See GLAUCE). This action was followed by another more atrocious. Medea killed two of her children in their father's presence, and, when he attempted to punish the barbarity, she fled through the air upon a chariot drawn by winged dragons. From Corinth Medea came to Athens, where she married king Ægeus. From her connection with Ægeus, Medea had a son, who was called Medus. Soon after, when Theseus wished to make himself known to his father (see ÆGEUS), Medea, jealous of his fame, and fearful of his power, attempted to poison him at a feast which had been prepared for his entertainment. Her attempts, however, failed of success, and the sight of the sword which Theseus wore by his side convinced Ægeus that the stranger against whose life he had so basely conspired was no less than his own son. The father and the son were reconciled, and Medea, to avoid the punishment which her wickedness deserved, fled, at length, from Athens, and came to Colchis, where, according to some, she was reconciled to Jason, who had sought her in her native country, after her sudden departure from Corinth.

MEDE'OLA. Climbing African asparagus. In botany, a genus of the class hexandria, order trigynia. Calyxless; corol six-parted, revolute; berry superior, three-seeded. Three species: Virginia: Æthiopia: the Cape.

MEDIA, a celebrated country of Asia, bounded on the north by the Caspian sea, west by Armenia, south by Persia, and east by Parthia and Hyrcania. It was originally called Aria till the age of Medus, the son of Medea, who gave it the name of Media. The Medes were warlike in the primitive ages of their power, and were remarkable for the homage they paid to their kings, who were styled king of kings. This title was afterwards adopted by their conquerors, the Persians, and it was still in use in the age of the Roman emperors.

MEDIA, in botany. See DODECATHEON.

MEDIANA, the name of a vein or little vessel, made by the union of the cephalic and basilic, in the bend of the elbow.

MEDIANT, in music, the appellation given to the third above the key-note, because it divides the interval between the tonic and the dominant into two thirds. When the lower of these thirds is minor and the upper major, the key is minor; and when the lower third is major and the upper minor, the key is major.

MEDIASTINUM, in anatomy, a double membrane, formed by a duplicature of the pleura; serving to divide the thorax and the lungs into two parts, and to sustain the viscera, and prevent their falling from one side of the thorax to the other. See ANATOMY.

To MEDIATE. *v. n.* (from *medius*, Latin). 1. To interpose as an equal friend to both parties; to intercede (*Rogers*). 2. To be between two (*Digby*).

To ME'DIATE. *v. a.* 1. To effect by mediation (*Clarendon*). 2. To limit by something in the middle (*Holder*).

ME'DIATE. *a.* (*mediat*, French). 1. Interposed; intervening (*Prior*). 2. Middle; between two extremes (*Prior*). 3. Acting as a mean: unusual (*Wotton*).

ME'DIATELY. *ad.* (from *mediate.*) By a secondary cause (*Raleigh*).

MEDIA'TION. *s.* (*mediation*, French). 1. Interposition; intervention; agency between two parties, practised by a common friend (*Bacon*). 2. Agency interposed; intervenient power (*South*). 3. Intercession; entreaty for another.

MEDIATOR, a person that manages or transacts between two parties at variance in order to reconcile them. The word, in Scripture, is applied, 1. To Jesus Christ, who is the only intercessor and peace-maker between God and man; 1. Tim. ii. 5. 2. To Moses, who interposed between the Lord and his people, to declare unto them his word; Deut. v. 5. iii. 19.

MEDIATORIAL. ME'DIATORY. *a.* (from *mediator.*) Belonging to a mediator.

MEDIATORSHIP. *s.* (from *mediator.*) The office of a mediator.

MEDIATRIX. *s.* A female mediator (*Ains.*)

MEDICAGO, in botany, a genus of the class diadelphia, decandria. Legume compressed, spiral, forcing back the heel of the corol from the banner. Thirty-seven species, almost all natives of the south of Europe; four common to the pastures and sandy soils of our own country. They are thus subdivided:

A. Legumes crescent-shaped, more or less twisted; comprising nine species; all denominated moon-trefoil.

B. Legumes spirally twisted, comprising the rest, and denominated medich.

Of all these the only species particularly worthy of notice is M. sativa, lucerne. It pertains to the former division, and is specifically characterised by having its peduncles racemed; legumes smooth, spirally twisted; stipules very entire; leaflets oblong, toothed. As a green fodder it has of late years been very generally recommended and very successfully cultivated by our graziers.

MEDICAL. *a.* (*medicus*, Lat.) Physical; relating to the art of healing (*Brown*).

MEDICALLY. *ad.* (from *medical.*) Physically; medicinally (*Brown*).

MEDICAMENT, *s.* (*medicamentum*, Lat.) Any thing used in healing; generally topical applications (*Hammond*).

MEDICAMENTAL. *a.* (from *medicament.*) Relating to medicine, internal or topical.

MEDICAMENTALLY. *ad.* After the manner of medicine (*Brown*).

To MEDICATE. *v. a.* (*medico*, Lat.) To tincture or impregnate with any thing medicinal (*Arbuthnot*).

MEDICATION. *s.* (from *medicate.*) 1. The act of tincturing or impregnating with medicinal ingredients (*Bacon*). 2. The use of physic (*Brown*).

MEDICINABLE. *a.* (*medicinalis*, Latin.) Having the power of physic (*Bacon*).

MEDICINAL. *a.* (*medicinalis*, Latin.) 1. Having the power of healing; having physical virtue (*Milton*). 2. Belonging to physic (*Butler*).

MEDICINALLY. *ad.* Physically (*Dryden*).

MEDICINE. (*medicina*, Lat. of uncertain derivation; perhaps from μηδος, μηδομαι, *cura, consilium; curam gerere, consulere;* though this root was seldom or never, among the Greeks, applied to the study or cure of diseases, but generally θεραπευω or ιατρευω, the latter of which has never been anglicised, but from the former of which we obtain the word *therapeutics*). The art or science of healing. In this extensive and general sense it includes the materia medica, or substances employed in medicine; pharmacy, or the mode of compounding them; and praxis, or the phænomena of diseases and practice of medicine. In a more limited, and perhaps a more correct sense, however, the term is confined to the last division; and in this sense alone we shall understand it in the present instance, referring the reader to the article MATERIA MEDICA for the substances employed in the art of healing, and to the article PHARMACY for the mode of compounding them, and their respective results in a state of combination. Thus limited, we shall consider the subject of medicine under the following heads: its History; its Theory; its Scope (usually called Nosology); and its Practice: and in so doing the present writer considerably avails himself of an article upon the same subject, which, by particular request, he drew up two or three years ago for another highly respectable work of a similar kind; to which, however, he will make two or three important additions, so as to render it as complete as the narrow scope to which we are necessarily confined will allow us.

PART I.

History of Medicine.

The commencement of the medical profession, whether regarded as an art or a science, or both, is lost in the darkness of the earliest ages. The fabulous history of the ancients derives it immediately from their gods; and even among the moderns, some writers of established reputation are of opinion that it may justly be considered as of divine origin: but without adopting any supposition, of which no probable evidence can be given, we may conclude, that mankind were naturally led to it from casual observations on the diseases to which they found themselves subjected; and that therefore, in one sense at least, it is as ancient as the human race; but at what period it began to be practised as an art, by particular individuals following it as a profession, is not known. The most ancient physicians we read of were those who embalmed the patriarch Jacob by order of his son Joseph. The sacred writer styles these physicians servants to Joseph, whence we may be assured that they were not priests, as the first physicians are generally supposed to have been; for in that age we know the Egyptian priests were in such high favour, that they retained their liberty, when, through a public calamity, all the rest of the people were made slaves to the prince. It is not probable, therefore, that, among the Egyptians, religion and medicine were originally conjoined; and if we suppose the Jews not to have invented the art, but received it from some other nation, it is as little probable that the priests of that nation were their physicians as those of Egypt. That the Jewish physicians were absolutely distinct from their priests, is very certain. Yet as the Jews resided for such a long time in Egypt, it is probable they would retain many of the Egyptian customs, from which it would be very difficult to free them. We read, however, that when king Asa was diseased in his feet, he sought not to the Lord, but to the physicians. Hence we may conclude, that among the Jews the medicinal art was looked upon as a mere human invention; and it was thought that the Deity never cured diseases by making people acquainted with the virtues of this or that herb, but only by his miraculous power. That the same opinion prevailed among the heathens, who were neighbours to the Jews, is also probable from what we read of Ahaziah king of Judah, who having sent messengers to enquire of Baalzebub, god of Ekron, concerning his disease, he did not desire any remedy from him or his priests, but simply to know whether he should recover or not. What seems most probable on this subject therefore is, that religion and medicine came to

be mixed together only in consequence of that degeneracy into ignorance and superstition which took place among all nations. The Egyptians, we know, came at last to be sunk in the most ridiculous and absurd superstition; and then, indeed, it is not wonderful to find their priests commencing physicians, and mingling charms, incantations, &c. with their remedies. That this was the case, though long after the days of Joseph, we are very certain; and indeed it seems as natural for ignorance and barbarism to combine religion with physic, as it is for a civilized and enlightened people to keep them separate. Hence we see, that among all modern barbarians, their priests or conjurors are their only physicians.

We are so little acquainted with the state of physic among the Egyptians, that it is needless to say much concerning them. They attributed the invention of medicine, as they did also that of many other arts, to Thoth, the Hermes or Mercury of the Greeks. He is said to have written many things in hieroglyphic characters upon certain pillars, in order to perpetuate his knowledge, and render it useful to others. These were transcribed by Agathodemon, or the second Mercury, the father of Tat, who is said to have composed books of them, that were kept in the most sacred places of the Egyptian temples. The existence of such a person, however, is very dubious; and many of the books ascribed to him were accounted forgeries as long ago as the days of Galen. There is also great reason to suspect, that those books were written many ages after Hermes, and when physic had made considerable advances. Many of the books attributed to him are trifling and ridiculous; and though sometimes he is allowed to have all the honour of inventing the art, he is, on other occasions, obliged to share it with Osiris, Isis, and Apis, or Serapis. After all, the Egyptian physic appears to have been little else than a collection of absurd superstitions. Origen informs us, that they believed there were thirty-six demons or gods of the air, who divided the human body among them; that they had names for all of them; and that by invoking them according to the part affected, the patient was cured. Of natural medicine we hear of none recommended by the father of Egyptian physic, except the herb moly, which he gave to Ulysses, in order to secure him from the enchantments of Circe; and the herb mercury, of which he first discovered the use. His successors made use of venesection, cathartics, emetics, and clysters. There is no proof, however, that this practice was established by Hermes: on the contrary, the Egyptians themselves pretended, that the first hint of those remedies was taken from some observations on brute animals. Venesection was taught them by the hippopotamus, which is said to perform this operation upon itself. On these occasions, he comes out of the river, and strikes his leg against a sharp-pointed reed. As he takes care to direct the stroke against a vein, the consequence must be a considerable effusion of blood, and this being suffered to run as long as the creature thinks proper, he at last stops up the orifice with mud. The hint of clysters was taken from the ibis, a bird which is said to give itself clysters with its bill, &c. They used venesection, however, but very little, probably on account of the warmth of the climate; and the exhibition of the remedies above mentioned, joined with abstinence, formed most of their practice. The Greeks too had several persons to whom they attributed the invention of physic, particularly Prometheus, Apollo or Pæan, and Æsculapius; which last was the most celebrated of any. But here we must observe, that as the Greeks were a very warlike people, their physic seems to be little else than what is now called surgery, or the cure of wounds, fractures, &c. Hence Æsculapius, and his pupils Chiron, Machaon, and Podalirius, are celebrated by Homer only for their skill in curing these, without any mention of their attempting the cures of internal diseases. We are not, however, to suppose that they confined themselves entirely to surgery. They no doubt would occasionally prescribe for internal disorders; but as they were most frequently conversant with wounds, we may naturally suppose the greatest part of their skill to have consisted in knowing how to cure these. If we may believe the poets indeed, the knowledge of medicine seems to have been very generally diffused. Almost all the heroes of antiquity are reported to have been physicians as well as warriors. Most of them were taught physic by the centaur Chiron. From him Hercules received instructions in the medicinal art, in which he is said to have been no less expert than in feats of arms. Several plants were called by his name; from whence some think it probable that he found out their virtues, though others are of opinion that they bore the name of this renowned hero on account of their great efficacy in removing diseases. Aristæus king of Arcadia was also one of Chiron's scholars, and supposed to have discovered the use of the drug called silphium, by some thought to be asafœtida. Theseus, Telamon, Jason, Peleus, and his son Achilles, were all renowned for their knowledge in the art of physic; the last is said to have discovered the use of verdigris in cleansing foul ulcers. All of them, however, seem to have been inferior in knowledge to Palamedes, who hindered the plague from coming into the Grecian camp after it had ravaged most of the cities of Hellespont, and even Troy itself. His method was to confine his soldiers to a spare diet, and oblige them to use much exercise. The practice of these ancient Greek physicians, notwithstanding the praises bestowed upon them by their poets, seems to have been very limited, and in some cases even pernicious. All the external remedies applied to Homer's wounded heroes were fomentations; while, inwardly, their physicians gave them wine, sometimes mingled with cheese scraped down. A great deal of their physic also consisted in charms, incantations, amulets, &c. of which, as they are common to all superstitious and ignorant nations, it is superfluous to take any farther notice. In this way the art of medicine continued among the Greeks for many ages. As its first professors knew nothing of the animal economy, and as little of the theory of diseases, it is plain, that whatever they did must have been in consequence of mere random trials, or empiricism, in the most strict and proper sense of the word. Indeed, it is evidently impossible that this, or almost any other art, could originate from any other source than trials of this kind. Accordingly, we find that some ancient nations were accustomed to expose their sick in temples, and by the sides of highways, that they might receive the advice of every one who passed. Among the Greeks, however, Æsculapius was reckoned the most eminent practitioner of his time, and

his name continued to be revered after his death. He was ranked amongst the gods; and the principal knowledge of the medicinal art remained with his family to the time of Hippocrates, who reckoned himself the seventeenth in a lineal descent from Æsculapius, and who was truly the first who treated of medicine in a regular and rational manner.

Hippocrates, who is supposed to have lived four hundred years before the birth of Christ, is the most ancient author whose writings have descended to the present day: and he is hence justly regarded as the father of medicine. In this period, and indeed till a century or two ago, the distinct branches of medicine and surgery were studied and practised by the same person: Hippocrates, therefore, has been universally regarded as having contributed equally to our physiological and anatomical knowledge of the human frame, and the few anecdotes relating to him for which we can find room have been already communicated to the reader under the article Anatomy. We shall here therefore only add those opinions of the Coan sage which more immediately apply to the science of general therapeutics, and which are most entitled to general attention.

As far as Hippocrates attempts to explain the causes of disease, he refers much to the humours of the body, particularly to the blood and the bile. He treats also of the effects of sleep, watchings, exercise, and rest; and all the benefit or mischief we may receive from them. Of all the causes of diseases, however, mentioned by Hippocrates, the most general are diet and air. On the subject of diet he has composed several books, and in the choice of this he was exactly careful; and the more so, as his practice turned almost wholly upon it. He also considered the air very much; he examined what winds blew ordinarily or extraordinarily; he considered the irregularity of the seasons, the rising and setting of the stars, or the time of certain constellations; also the time of the solstices, and of the equinoxes: those days, in his opinion, producing great alterations in certain distempers. He does not, however, pretend to explain how, from these causes, that variety of diseases arises which is daily to be observed. All that can be gathered from him with regard to this is, that the different causes above mentioned, when applied to the different parts of the body, produce a great variety of disorders; some of these he accounted mortal, others dangerous, and the rest easily curable, according to the cause from whence they spring, and the parts on which they fall. In several places also he distinguishes diseases, from the time of their duration, into acute, or short, and chronical, or long; he likewise distinguishes diseases by the particular places where they prevail, whether ordinary or extraordinary: the first, that is, those that are frequent and familiar to certain places, he called endemic diseases; and the latter, which ravaged extraordinarily sometimes in one place, sometimes in another, which seized great numbers at certain times, he called epidemic, that is, popular, diseases; and of this kind the most terrible is the plague: he likewise mentions a third kind, the opposite of the former; and these he calls sporadic, or straggling diseases: these last include all the different sorts of distempers which invade any one season, which are sometimes of one sort, and sometimes of another. He distinguished between those diseases which are hereditary, or born with us, and those which are contracted afterwards; and likewise between those of a kindly, and such as are of a malignant nature, the former of which are easily and frequently cured, but the latter give the physicians a great deal of trouble, and are seldom overcome by all their care.

A foundation for the theory and practice of medicine being thus laid, the science was pursued with great avidity by Praxagoras, who nevertheless ventured, in some respect, to oppose the practice of Hippocrates, and by Erasistratus and Herophilus, of whom the last, as a disciple of Praxagoras, inclined rather to the Praxagorean than the Hippocratic school. Erasistratus, however, acquired a higher fame, though a more steady adherent to the older and Hippocratic doctrines, and to him we are indebted for the first regular indications of the pulse. About this period the profession of medicine began to be divided into the three branches of dietetic, pharmaceutic, and chirurgic; or those who pretended to cure by regimen alone, disregarding and even despising pharmacy; those who undertook to cure chiefly by pharmaceutic preparations, (of which number was Erasistratus himself); and those who devoted their whole time and attention to the chirurgical department of the medical art.

The next division of medical practitioners was into that of dogmatists and empyrics, the latter having commenced with Serapion, of Alexandria, about the year 287 before Christ, who, according to Galen, retained the mode of practice of Hippocrates, but pretended to despise his mode of reasoning. In reality, the sect to which Serapion belonged, and of which if not the founder, he was a very zealous supporter in its earliest infancy, depended upon their own personal experience alone, whether progressive or fortuitous. On the contrary, the dogmatists affirmed, that there is a necessity for knowing the latent as well as the evident causes of diseases, and that physicians ought to understand the natural actions and functions of the human body, and consequently its internal organs.

The physicians of chief fame who flourished subsequently to this division were Asclepiades, who opposed the Hippocratic theory of natural power and sympathy or attraction, by engrafting upon medicine the physical principles of the Epicurean philosophy; Themison, the founder of the methodic sect, whose doctrines evinced equal hostility to the dogmatists and empyrics, and divided diseases into the two classes of hypertonic and atonic, a division, which, in various modifications, has descended to the present day; Thessalus, contemporary with Nero, a man of some merit, but of inordinate vanity; and Celsus, deservedly denominated the Latin Hippocrates, whose work is equally valuable for the purity of its language, and the knowledge it communicates of the state of medicine at the time he wrote.

About the year after Christ 131, in the reign of Adrian, appeared the celebrated Galen, whose name makes so conspicuous an appearance in the history of physic. Practitioners were at this time divided into the three sections of methodists, dogmatists, and empyrics; Galen inclined to the second party, but with a true ecclectic spirit undertook to combine with its doctrine whatever existed of real worth in the two adverse systems, and hence to reform and give a finish to the science of medicine, beyond what it had ever possessed before. For the most part, he was a fol-

lower of Hippocrates, whose name he revered and whose opinions he commented upon, asserting in the course of his comments, that he had never been thoroughly understood before. Like Hippocrates, he denominated the vital principle *nature;* like him, he admitted the existence of four distinct humours, from the predominancy or deficiency or disproportion of which originate the different temperaments of the animal frame, and the varieties in the different diseases to which it is subject: these humours are the blood, phlegm, yellow and black bile. He likewise established three distinct kinds of auras, gasses or spirits, a natural, a vital, and an animal, which he regarded as so many instruments to distinct faculties; referring the seat and action of the first chiefly to the liver, of the second to the heart, of the third to the brain. His authority, in spite of all the fancies which are interwoven into his system, continued to prevail till the overthrow of the Roman empire, and learning and the arts were transferred to the eastern empire, under the auspices of which, however, the science of medicine does not appear to have made any progress; the Saracenic physicians totally neglecting the study of anatomy, and every other auxiliary pursuit, and merely adding to the materia medica a variety of plants, whose names we now seldom hear of, and whose pharmaceutic virtues have long been despised and forgotten.

From the period at which we are now arrived till the commencement of the sixteenth century the history of medicine furnishes no particulars of interest. It was this epoch that gave birth to Paracelsus, who having plunged deeply into the science of alchemy, if such a term as science be not prostituted by an application to such a subject, proscribing by one broad sweep all the reasonings of the ancient authors, endeavoured to explain all the facts and doctrines of medicine upon the principles of the fashionable pursuit of the day.

It was in 1628 that medicine acquired a knowledge of the momentous fact of the circulation of the blood, through the indefatigable labours of Dr. W. Harvey, who nevertheless had to struggle for years against a double torrent of nearly equal violence, before the jealousies and prejudices of the profession were completely mastered: some denying the fact altogether, and others contending that it was a point that had been ascertained for ages, and consequently that he was by no means entitled to the honour of the discovery. The establishment of this important fact, however, did not even for a long period after its general admission, produce all the advantages which might have been expected from it. For the physiologists of the day, in reasoning upon the powers by which this phœnomenon, as well as various others of the animal frame, was accomplished, unfortunately took hold of the mechanical philosophy as their guide: and every function was immediately attempted to be explained by the laws of projectiles, till the system at length destroyed itself, by the absurdity of the extent to which it was pushed.

Boerhaave, at this period, led the way to an admirable reformation, both of principle and practice; and by uniting the doctrines of Hippocrates with the philosophy of the times, framed a theory of medicine, upon the supposition of acrimony, lentor, and other changes in the circulating fluids. Contemporary with Boerhaave were Hoffman and Stahl; both of whom deviating from the theory of Boerhaave, the first laid the foundation of the spasmodic hypothesis, by resolving the origin of all diseases into an universal atomy, or an universal spasm in the primary moving powers of the system: and the second into the action of certain noxious agents, controuled, however, by the internal existence of a rational soul, that directs the entire economy. The humoral pathology nevertheless continued to prevail, till under the auspices of Dr. Cullen, the theories of Hoffman and Stahl were united into one common and ingenious system: a system which still holds its ground, though it has been since controverted by the sensorial hypothesis of Dr. Brown and Dr. Darwin. See Brunonian and Darwinian systems.

Part II.

Theory of Medicine.

Health is a system of harmony; and several of the older theories were founded upon this idea alone. A morbid affection in one organ, or set of vessels, is almost sure to produce a morbid affection in another; and a morbid secretion of one kind is generally succeeded by a morbid secretion of a second, a third, and even a fourth. The head cannot suffer without affecting the stomach; nor the stomach without affecting the skin; nor the skin without affecting the kidneys. The bloodvessels influence the nerves, the nerves the secernents, or *vice versâ.* The study of medicine therefore necessarily implies, as its first or preliminary pursuit, a general study of the animal frame, in its fluids and solids, its structure, its functions, and its habits; and in this preliminary pursuit consists that part of medicine which is usually denominated its theory.

Animal Fluids and Solids.

Fluids.—These may be divided into, 1. The blood. 2. Those formed during digestion, before the food is converted into blood. 3. The secreted fluids.

The blood—This consists of serum, coagulable lymph, red part, superfluous water, and extraneous substances introduced.

The serum, coagulable lymph, and superfluous water, are diffused through one another, and the red part is mechanically mixed with them. Some of the extraneous substances are also mechanically mixed with them, and some diffused through them.

The serum is fluid in any degree of heat between 30 and 160 of Fahrenheit's thermometer. In a less heat it freezes, in a greater it coagulates. It consists chemically of a coagulable matter, and water in which common sal ammoniac, and phosphoric ammoniac, and generally common salt, and frequently salenites, and fixed ammoniac, are dissolved; but it is a question whether the water chemically combined in the serum be also united with those neutral salts, or whether the serum, and the solution of these, are only diffused through one another. It is probably in itself colourless and inodorous; but it receives a yellowish or brownish hue from the putrescent mucilage of the blood, and acquires a smell from the essential oil. If it contained no neutral salts, it would be insipid, and incapable of stimulating. The superfluous water may be separated from it by filtration in the body, but that which is chemically combined with the other parts cannot. All the water may be evaporated from it by a less heat than 140 degrees of Fahrenheit's

thermometer, if it be exposed to the air. The other parts remain after this operation solid, and soluble again in water by commixture alone. The separation or addition of superfluous water does not affect its viscidity, so far as that is of any consequence in the circulation; but the separation of that water which is in chemical combination may render it more viscid. The water in chemical combination is never separated while the serum is contained in the blood-vessels; and of consequence this part of the blood is always equally viscid, so far as its viscidity can affect the circulation or secretions. It may be coagulated by acids, oils, alcohol, &c. but no substance can get into the blood-vessels in a sufficient degree of concentration to coagulate it, excepting by injection. It may be coagulated by a juice, secreted in the stomach. It has seldom, if ever, been found coagulated in the body. The only perceptible difference which has appeared in the coagulable part of the serum, from any observation hitherto made public, is, that sometimes, in coagulating, its parts adhere more or less firmly. The coagulable lymph is a compound of water and a coagulable mucilage. As long as it continues in the course of circulation, it is fluid in any degree of heat between 30 and 120 degrees of Fahrenheit's thermometer. When it is taken out of the blood-vessels it coagulates; whether it be in motion or at rest, exposed to the air or not, or in the heat of the human body, or in any other degree of heat. It has hardly ever been found coagulated in the blood-vessels of a living animal, unless they have been enlarged into aneurisms or varices. It is, however, generally found coagulated in the large vessels of the human body on dissection, and sometimes separated from the other parts; but, to all appearance, these coagulations have always taken place after death. This part of the blood coagulating, when taken out of the vessels, or after death, in the same chemical circumstances in which it remained fluid when the animal was alive, has given occasion to an opinion, that this fluidity is one of those properties superadded to the matter of the body by life. When it is taken out of the blood-vessels, it may be prevented from coagulating by saturating the whole blood with common sea-salt, and perhaps by some of the other neutral salts. Although the coagulable part of the serum and coagulable lymph have different properties, the coagulum formed from both is pretty nearly the same. The coagulum may be dissolved in water by boiling or putrefaction; and may be united with concentrated acids, with caustic alkalis, and calcareous earth, and with some metallic salts, into a substance soluble in water; but none of these can get into the system by absorption, either from the intestines, or any other part, so as to produce this effect. Both the superfluous water and serum are capable of being separated from the coagulable lymph by filtration in the body.

When the blood is received into a proper vessel, the coagulation of this part gives an appearance of solidity to the whole: but soon after the whole becomes thus apparently solid, part of the serum, of the superfluous water, and of the water which was contained in the coagulable lymph, oozes out from the whole mass, and brings along with it part of any extraneous fluid that may have been in the blood-vessels; leaving behind what is commonly called the red globules, the mucilage of the coagulable lymph, and any solid particles that may have been in the blood. This is called the spontaneous separation.

When the arteries are acting strongly, whether the whole habit be strong or not, the coagulable lymph is more fluid, and longer in coagulating. Of consequence, it lets the red particles, which are the heaviest part of the blood, fall down towards the bottom, before it coagulates; and upon the spontaneous separation the coagulum is divided into two parts; the upper consisting of the coagulum of the coagulable lymph alone (which has in this case been called the buff); the under, consisting partly of this and partly of the red particles.

Although part of the coagulable lymph would separate from the red particles, it may be prevented by taking the blood from a small vessel, or from a small orifice, or by letting it run along the skin, before it falls into the vessel into which it is received, or by receiving it into a vessel, the surface of which is large in proportion to its contents; as in all these cases the coagulation is forwarded. On the other hand, if it stagnate in the blood-vessel for some time before it is taken out, there will be a separation, when none would otherwise have happened. Whether the coagulable lymph separate in part from the red particles or not, it coagulates sometimes into a firmer, sometimes into a looser mass, generally in proportion to the strength of the system. All the substances which coagulate the serum have the same effect on the coagulable lymph; but none can be applied to it in the blood-vessels, in a sufficient degree of concentration to coagulate it, excepting by injection. The coagulable lymph is probably in itself colourless, insipid, inodorous, and incapable of stimulating. Whilst it remains in the blood-vessels it is chemically combined with a certain proportion of water, from which it cannot be separated but by coagulation, neither will it combine with a larger proportion. Water mechanically mixed with it does not alter its viscidity, so far as that effects the circulation or secretions. No other differences besides those already taken notice of are observable in its properties. The coagulable lymph and serum are both capable of putrefaction, and are converted by it into a mucilaginous matter not coagulable by heat. If this mucilaginous matter should undergo a further putrefaction, it emits a fœtid vapour, and is converted into saline substances, calcareous earth, and water.

Upon viewing the red part of the blood with a deep magnifier, in the solar microscope, as it circulates in the blood-vessels of a living animal, it appears to be divided into a number of small particles, which are apparently annular, and exceedingly flexible. While the animal is respiring, and the blood circulating, it is of a scarlet colour in the arteries, and of a Modena red in the veins; but if the respiration be stopped, that blood which circulates afterwards through the lungs continues of a Modena red. If it be taken out of the veins, kept moist, and exposed to respirable air, it becomes of a scarlet colour; if it be taken out of the arteries, and covered from the air, or if it stagnate in them, its colour is changed to a Modena red. Various other substances alter the colour of this part.

It seems to have a sweetish taste, to be inodorous, and void of stimulus. Its specific gravity is but a very little more than that of the serum or coagulable lymph. It is readily soluble in water, but not in the serum. It is not soluble in

a saturated solution of neutral salts. It is capable of undergoing the putrefactive fermentation, the first stage of which breaks it down into smaller particles, and renders it of a dark colour. It is afterwards converted into a mucilage, soluble in the serum.

The superfluous water in the blood is that diffused through the serum and coagulable lymph; and it contains a part, perhaps the whole of the salts. These salts are chemically combined with a part of it only, and this solution is diffused through the remaining part. The water diffused may be separated from the solution by filtration in the body. The solid part of the blood, left after evaporation of the water by a heat less than that of boiling water, amounts to from one fourth to one fifth of the whole.

A great variety of extraneous substances, both fluid and solid, may be introduced into the blood-vessels by absorption; but none of them in such proportion as to produce any alteration in the blood, except by fermentation. When any ferment is introduced into the blood-vessels, it acts upon a part of the blood only; the greatest part remaining to all experiment exactly the same as before. It may indeed be doubted whether any ferment acts on any part of the blood in the blood vessels, or whether ferments only act on extravasated fluids.

By fermentation, in this place we merely mean the conversion of one compound into another, by a new arrangement or combination of its elements. What is commonly called putrefaction consists of two fermentations, which we shall call by the names of the first and second stage.

All animal solids and fluids may be reduced by the first into a mucilaginous mass, soluble in water, and diffusible through any quantity of it. The red part of the blood first breaks down into smaller particles, before it is formed into a perfect putrescent mucilage. The first stage takes place without any effervescence. The second stage converts this mucilage into earths, and salts, a fœtid vapour, gass and water. The first and second stage of putrefaction take place in a small part of the blood, or it is destroyed by some other operation; for, after having coagulated the serum, if we squeeze out the water, and evaporate it, there is left a mucilaginous matter similar to that formed by putrefaction. The salts formed in the blood-vessels, excepting phosphoric ammoniac, may be formed by the last stage of putrefaction; and those formed by the last stage are found in the blood-vessels, excepting nitrous selenites, and nitrous ammoniac. This mucilage, and these salts, are always carrying off by urine; the present blood is always diminishing, and the vessels require a fresh supply from the food. The blood is always in the most powerful circumstances of putrefaction; which are, a heat of 98 degrees of Fahrenheit's thermometer, fluidity, a moderate exposure to air, and motion: but it is prevented from putrefying by the action of the vessels; nor can any ferment, or other circumstance, induce the fermentation, till this action is altered, except perhaps the introduction of chyle, intermixed with putrid matter.

In diseases, the first stage often takes place in part of the blood; the second stage sometimes, although but seldom.

Rules of the digestive Process.

Digestion is the conversion of the food into chyle, and afterwards into blood. The food may consist of farinaceous or mucilaginous vegetable substances, native vegetable acid, sugar, expressed oil, animal solids, or animal fluids, containing a mucilaginous matter. These substances may be digested, if they be taken singly, or if they be mixed together.

The blood formed does not differ sensibly in its properties, whether the one or the other of them be used singly, or several of them together; provided the organs of digestion be sufficiently powerful to convert them into blood.

If the food be solid, it is generally broken down by the teeth, or by some other apparatus. But mashing it down with water is not sufficient to alter its chemical properties, and convert it into chyle and blood.

It is mixed in the stomach with the watery fluids we drink, and with the mucilaginous watery fluids secreted by the salivary and other glands. It is sometimes dissolved in water before it is used: but it is often rendered solid by a previous preparation, or coagulated by a substance secreted in the stomach. Simple solution in water does not convert it into chyle or blood.

If it be previously dissolved in water, it affords less nourishment than if exhibited solid.

It is necessary that it remain in the stomach for some time, in order to its digestion; and the only process it can go through in the organs of digestion, that is capable of altering its chemical properties, is fermentation. Its fermentation is not attended with effervescence in a healthy stomach. Neither is there any vapour found in the intestinal canal in health.

If vegetable food be used, an acid is often produced, but not in perfect health. This acid is destroyed in the duodenum by the bile. If animal food be used alone, no acid is produced. But the stronger the stomach, and the more perfect the digestion, the less acid is formed from vegetable food.

No stage of the putrefactive fermentation takes place, during the conversion of it into chyle and blood, if the digestion be perfect.

The fermentation which takes place is peculiar to the organs of digestion, and has never been produced by any artificial means yet attempted.

The fermentation which takes place in the stomach forwards the solution of solid food in the watery menstruum: and these dissolve sooner in the stomach than they can be dissolved in water in the same heat, by any means hitherto found out.

If the stomach do not act properly, solid food remains undissolved; vegetable, and mixtures of vegetable and animal substances become acid; animal substances putrefy; a quantity of air is separated; and the food is not digested and converted into chyle.

Only that part of the food which is digested affords nourishment; the nourishment therefore is in proportion to the food and the digestion. But when food, either from its quantity or quality, cannot be digested, it is apt to occasion great disturbances in the system, while it is contained in the stomach and intestines.

The only sensible alterations produced in the blood by different foods, are in its quantity; or in the proportion of superfluous water; or that sometimes a long use of animal food, especially if it be preserved by salt, brings on a degree of putrefaction.

The chyle is formed from the food in the intestines, and absorbed by the lacteals.

The whole fluid absorbed is not chyle, but a mixture of chyle, and the solution of those substances which were simply dissolved in water without being digested.

Quere, Whether a simple solution of mucilaginous, animal, or vegetable substances can be converted into blood, without being formed into chyle in the stomach and intestines?

Chyle is fluid while in the lacteals; when exposed to the air it coagulates; it is rendered white from a mixture of expressed oil.

When coagulated, a fluid may be squeezed out, which probably contains a coagulable matter, and sugar.

Fluids secreted in the Body.

The secreted fluids either exist in the blood-vessels, being mechanically mixed with, or diffused through the other fluids, and require only a mechanical separation; or they do not exist in the blood-vessels, their elements only being contained there: but these elements are not combined, so as actually to form the secreted fluid. It is therefore requisite, that some chemical operation should take place in the secretory organ, by which the elements shall be combined, so as to form the matter secreted.

The fluids separated mechanically are, 1. The matter of the insensible perspiration. 2. The urine. 3. The sweat. 4. Perhaps the milk. All these are evacuated from the body.

The fluids formed in the secretory organ, by a chemical operation, are, 1. The mucus. 2. The saliva. 3. The pancreatic juice. 4. The semen. 5. The bile. 6. The wax in the ear. 7. The sebaceous matter. 8. The coagulating matter of the stomach, &c. These are retained and employed in the body.

The matter of insensible perspiration is separated from the surface of the lungs, and from the skin by evaporation. The quantity evaporated depends upon the quantity of superfluous water in the blood-vessels, the heat of the air, the quantity of air applied, and the contraction or relaxation of the vessels, from which the evaporation takes place.

When the body is in its natural state, that part of the insensible perspiration, which is capable of condensation, consists of water, with a very small proportion of a mucilaginous matter and essential oil, and sometimes perhaps volatile alkali, and gas.

There is no reason to suppose, that any matter flies off that cannot be condensed, excepting gas, from any experiment hitherto made.

Should any other substance, capable of emitting vapour in the heat of the human body, get into the blood-vessels, or be formed on the surface of the skin, lungs, or in any of the passages of the air in breathing, it may be mixed with the insensible perspiration.

Some of these substances may be putrid vapour, variolous, morbillous, and other infectious matters, alcohol, and other volatile extraneous substances, &c.

The matters thrown off by insensible perspiration may be evacuated by the other excretions.

The health is not in proportion to the quantity of insensible perspiration.

The urine, in the common state of the body, is a transparent brownish fluid, which, upon cooling, has a mucilaginous matter separated, capable of being redissolved in heat, which we call the separating mucilage. In health, this separating mucilage is generally in such quantity as to remain suspended in the urine after its separation, forming what has been called the cloud.

It is sometimes totally absent in health, but much more frequently in diseases; sometimes it is in quantity sufficient to carry the cloud to the bottom, and form a mucous sediment; and sometimes it falls down in a flaky powder, and forms what has been called a lateritious sediment, which is commonly of a brick colour, and now and then white. This kind of sediment often takes place on the going off of acute diseases; but it also happens in health, and while diseases subsist in their full force, particularly when they affect the urinary passages, or parts near them.

Sometimes the separating mucilage is separated in a powder, remains suspended in the urine, and renders it turbid: and after this separation, if the urine be filtrated from it, it is transparent, consisting of water which contains a mucilage, and salts.

1st, A mucilage, similar to that formed by the first stage of putrefaction; which is of a brownish colour, and gives the greatest part of the colour to the urine. Its quantity varies considerably; but the proportion of it in the urine is always small. If the water be evaporated from it, it will redissolve, and it may be diffused through any quantity of water in any heat. It is not coagulable.

2dly, The salts of the urine are common salt, common sal ammoniac, phosphoric ammoniac, sulphuric selenites, and muriatic selenites.

Watery fluids may pass through the blood-vessels, and by the kidneys, hardly carrying off any thing with them, especially if large quantities be drunk at a time, and the external vessels be contracted.

Sometimes calcareous earth is found in the urine, suspended by mechanical mixture, or at least not combined with an acid.

Indeed any extraneous substance, soluble in water, that may get into the blood-vessels, may be evacuated along with the urine; such as acids, alkalies, neutral and other saline substances; infusion of rhubarb, and other mucilaginous vegetable juices; bile, pus, and other fluids formed in the body.

If the kidneys be relaxed, or stimulated, chyle, serum, coagulable lymph, and even the red part of the blood may be thrown out. The red part may also be broken down by putrefaction, and pass off by the kidneys of a very dark colour, disturbing the transparency, and sometimes forming a sediment.

If the heart and arteries act more strongly, or frequently, than they do in their natural state, a quantity of expressed oil comes away with the urine, and forms a film on the surface, or a ring round the vessel into which it is received.

The urine always contains a portion of the essential oil of the urinary passages, and sometimes a portion of their mucus.

As far as we are capable of judging of the nature of the sensible perspiration from the very small quantity that can be collected, it contains nearly the same substances as the urine; only that, instead of the essential oil of the urinary passages, it is mixed with the sebaceous matter of the skin, which gives it a degree of whiteness, and a smell different from that of the urine.

Milk is secreted naturally in the breasts of women, for the nourishment of their young, sometimes during pregnancy, and always after childbirth. There are said to have been instances of its being secreted at other times, and from other

parts of the body. It is a whitish fluid, which separates into two parts, upon being left at rest in a moderate degree of heat: the upper part consists principally of expressed oil, with a mixture of the other part, and is whiter and more opaque, and is called the cream. The under part consists of a solution of coagulable matter and sugar, in water; with a small mixture of expressed oil, and is called the skim milk.

The expressed oil is fluid in the heat of the human body, but solid in the heat of the atmosphere. It is only mechanically mixed with the other part. It is tinged with, and receives a flavour from, the essential oil of the food and of the body. It is found not only in different proportions in the milk of different women, but also in the milk of the same woman at different times, and even in that which issues from the different excretory ducts of the glands of the same breast.

The coagulable matter only differs from the coagulable matter of the serum in its coagulability, and its proportion to the water. It is not coagulable by a less heat than that of boiling water, and by that only, if the water be evaporated from it. It may be coagulated by acids, alcohol, several metallic and aluminous salts, and vegetable juices; but it requires that they should be applied to it in a greater degree of co-centration than the serum does, in order to its coagulation.

Heat assists the coagulating power of these substances; and it is readily coagulable by the coagulating juices of the stomach, and coagulates in the stomach of a living animal, whether any acid be contained in it or not.

The sugar contained in the milk does not differ in its properties from that of the sugar-cane, but its proportion is always small; and when a woman makes use of vegetable food, it seems to be in greater proportion than when she uses animal. The milk of a bitch, using animal food alone, contains sugar.

If milk be kept for some time exposed to the air, and in the heat of the atmosphere, or of the human body, the sugar ferments, and is converted into vinegar, which coagulates the coagulable matter. The same change may take place in the breast, if it stagnate there for some time, or if the woman be suddenly affected with any of the passions of the mind that are attended with anxiety.

If blood be taken from the arm after a full meal, the serum is often mixed with a substance which gives it a degree of whiteness and opacity like milk.

The milk is secreted after a full meal in larger proportion than after a woman has fasted for some time. In the latter case, the proportion of the expressed oil, coagulable matter, and sugar, likewise diminishes, and the milk contains, besides these, the neutral salts of the blood, and acquires a bitterness from the sebaceous matter of the glands of the nipples.

In some women the milk always contains the salts of the blood, or the sebaceous matter of the nipples; and this not only gives it a bitter taste, but also sometimes a yellowish colour, and a thicker appearance.

The milk may contain any substance which is thrown into the stomach, simply dissolved in water, and absorbed by the lacteals, without going through the digestive fermentations, and being converted into chyle.

Mucus.—The surfaces of the membranes exposed to any extraneous matter, such as the skin and internal membrane of the mouth, nose, lungs, oesophagus, stomach, intestines, urinary passages, &c. are covered with mucus, which is a fluid of an adhesive viscidity approaching to a solid, and of greater viscidity in one part of the body than in another. It is a compound of a mucilage and water. It is more or less viscid, according to the quantity of water with which it is combined. It is of different degrees of viscidity in different parts of the body. It will not combine with more water than what is already contained in it: neither can its viscidity be altered by digesting it with water, unless it begin to putrefy; nor can the more viscid mucus of one part be converted into the less viscid of another.

If the water be evaporated from it by a gentle heat, the mucilage remains solid; if this be immersed in water, it will absorb that quantity which evaporated from it, but no more, and it will regain its former fluidity and viscidity.

For the most part, it contains either no neutral salts, or so small a proportion as cannot easily be rendered sensible to experiment. It is colourless, insipid, inodorous, and incapable of stimulating.

It combines with concentrated sulphuric, nitric, and muriatic acids, with concentrated solutions of some metallic salts, and also with concentrated or diluted solutions of caustic alkalies, and caustic calcareous earth, forming compounds soluble in, and diffusible through, water.

Acids, and some metallic salts dissolved in water and concentrated, but not to that degree as to dissolve it, alcohol and aluminous salts, coagulate it. It is also coagulable by the heat of boiling water, but not by a less degree of heat.

The mucus defends the membranes from being so much stimulated by any application as they would be, if they were not covered with it.

If the secretion be suddenly increased, the matter secreted is often a thin watery fluid, containing the salts of the blood, and in consequence of them, capable of stimulating; and the membranes are not defended from external applications.

If a greater secretion should continue than what naturally takes place, the mucus retains the salts, but often acquires a viscidity, and becomes incapable of being diffused through water: its colour, also, often grows white, greenish, or yellow; and now and then it acquires a smell: especially if the mucous glands or membrane be inflamed.

The *saliva* is secreted by several glands opening into the mouth; and the principal part of it is thrown down into the stomach, to answer some purpose in the digestion of the food.

It is a fluid of an adhesive viscidity, with difficulty diffusible through water. It consists of water, a mucilage similar to that of the mucus, and the salts of the blood, but not in so large a proportion as they are contained in the serum. It contains a larger proportion of water than the mucus.

In its other properties it is similar to the mucus, in as far as they have been investigated.

The *pancreatic juice* appears to be similar to the saliva, except that it is less viscid, and contains a larger proportion of the salts of the blood. Both are probably watery menstrua for the solution of the food in the stomach and intestines, their viscidity preventing them from being absorbed before they produce that effect.

They have been said to act as ferments during the digestion; but as the fermentations of the stomach have never been made to take place out of it, we cannot judge of this by any experiment hitherto communicated to the public.

Bile.—The blood from which the bile is formed has probably gone through one circulation, without being exposed to the air in the lungs, or mixed with the fluids brought by the lymphatics from the different parts of the body. The blood passes through the vessels of the abdominal viscera, before it arrives at the liver; but it does not take up any substance from them, or at least not in such a quantity as to be sensible to any experiment yet made public; but, on the contrary, it appears perfectly similar in all sensible qualities to the blood returning by the veins from the other parts of the body.

There is no appearance of bile in the vena portarum of a living animal.

When bile in the jaundice is contained in the blood-vessels, it is secreted by all the secretory organs, and it is evidently contained in all the secretions.

The bile is formed from the blood in the secretory vessels of the liver. It runs along the hepatic ducts into the ductus communis choledochus, and thence partly into the duodenum, and partly into the gall-bladder. It continues for some time in the gall-bladder, and there becomes more perfect in its properties; thence it returns into the ductus communis choledochus, and passes into the duodenum. It is a fluid of an oleaginous viscidity, consisting of a solution of a solid matter in water. If the water be not evaporated from it, no alteration is produced in it by any heat between 32 and 112 degrees of Fahrenheit's thermometer.

The bile in its natural state is diffusible through any proportion of water: and if the water be evaporated from the solid part by a heat not exceeding 112 degrees of Fahrenheit's thermometer, it is then also soluble in, and diffusible through, any quantity of water.

The solid matter of the bile melts if it be heated, and is decomposed if the heat be increased. If it be distilled by itself, it yields a larger proportion of empyreumatic oil than any of the other fluids, except the expressed oil, and perhaps the red part of the blood. It is of a yellow colour, and a sweetish bitter taste.

When it is not combined with more water than it generally is in the gall-bladder, it does not putrefy more readily than the blood; but if it be diluted with water, or watery fluids, it putrefies more readily.

Acids, and some of their compounds, decompose it, and precipitate from it a resinous matter. The acidity of the acid is lost by its combination with the other part; but if more acid be employed than what is necessary for the decomposition, the acidity of the superfluous quantity remains. The matter precipitated has the peculiar smell of the animal.

It is solid in the heat of the atmosphere, melts in a moderate degree of heat, and burns very readily. It is not soluble in water. It is partly soluble in alcohol.

If the passage of the bile into the duodenum be stopt, acidities are apt to take place in the intestinal canal, the peristaltic motion does not go on properly, the fæces lose their peculiar colour and smell, and often acquire a more putrid fetor, and the digestion is hurt, but not entirely prevented.

The properties of the other secreted fluids have not been sufficiently investigated by experiments for us to be able to give any satisfactory account of them.

ANIMAL SOLIDS.

These are a compound of mucilage and water. They are naturally flexible; but, if the water be evaporated from them by a gentle heat, they become friable. The water, chemically combined, cannot be separated from them by expression.

Exposed to about a red heat, they are decomposed; and if they be distilled by themselves, volatile alkali, empyreumatic oil, water, and calcareous earth, are formed. When free from essential oil, blood, and the salts of the fluids, they are colourless, insipid, and inodorous.

They differ in their flexibility and elasticity. Fibres and membranes are readily flexible, not capable of being broken by bending, and have a less degree of elasticity. Cartilage is less flexible, capable in general of being broken by bending, and more elastic. Cartilage often supplies the place of bone in young animals.

Heat, dilute acids, neutral salts, alcohol, metallic and aluminous salts, astringent juices of vegetables, and several other substances, coagulate them, i. e. separate part of the water chemically combined, and of consequence contract them, diminish their flexibility, and harden them. Substances coagulating the animal solids are called astringents.

If they be exposed to a freezing cold, the water freezes; and, upon thawing, their texture is found to be altered.

Concentrated sulphuric, nitrous, and muriatic acids, caustic alkalies, even in a diluted solution, quick lime, and several of the metallic salts, combine with them into a substance diffusible through, or soluble in, water; and destroy their texture at the same time.

They are capable of putrefaction in the same manner as the animal fluids.

GENERAL STRUCTURE OF THE HUMAN BODY.

The Blood-vessels.

There are cavities and tubes in the body, viz. the heart and blood-vessels, in which the red part of the blood, the coagulable lymph, and part of the serum and superfluous water, are usually contained. They consist of the heart, arteries, capillaries, and veins; for which see ANATOMY.

No red muscular fibres appear on the arteries, capillaries, or veins in the human body.

These vessels are all of them elastic, and capable of being distended, so as to contain a larger quantity of fluid than what is necessary to render them cylindrical.

Their elasticity is not sufficient to overcome the weight of their sides, and keep them cylindrical, if they be not filled with a fluid, excepting in that part of the aorta nearest the heart.

When an animal is dead, and no chemical or mechanical change has taken place in the vessels, the elasticity is the same as when the animal was alive.

When an animal is dead, and the vessels act by their elasticity alone, they are incapable of contracting to half the size they are of at their utmost distension, supposing them to continue cylindrical.

When an animal is alive, the blood-vessels are always cylindrical, excepting when they are compressed by a considerable external force. They are always full of blood.

When an animal is alive, the veins, capillaries, and small arteries are sometimes contracted to less than half the size they are of at other times, which cannot happen from their elasticity; therefore the veins, capillaries, and small arteries, in a living animal, have a contractile power, independent of their elasticity, by which they adapt themselves

to the blood, and continue cylindrical. This power is similar to the muscular power.

When the vessels contain more blood, they become longer, or their diameter is enlarged, or both; and *e contrario*, when they contain less blood, they become shorter, or their diameter diminishes, or both. The contractile power of the vessels is capable of diminishing either their length or diameter.

When an animal dies, the arteries and veins lose their cylindrical form, and are flattened, and the capillaries contain less blood, so that the blood sufficient to fill the vessels when the animal was alive is not capable of filling them after he is dead; therefore

The arteries, veins, and capillaries of a living animal are commonly contracted to a greater degree than they can be by their elasticity.

The elasticity is commonly endeavouring to distend them, but is always overpowered by the contractile power depending on life, which adapts the size of the vessels to the quantity of blood contained in them.

If the vessels be emptied to such a degree that they cannot adapt themselves to the blood, and continue cylindrical, the animal dies. The most essential effort of the living power is to adapt the vessels to the blood.

The Circulation, and the Powers producing it.

The blood passes from the left auricle of the heart into the left ventricle, from the left ventricle into the aorta, and from thence, by the smaller arteries, to the capillaries in every part of the body; from these it returns by the veins to the right auricle of the heart. The blood, for the most part, moves in one uniform direction in each artery, viz. from the heart towards the capillaries: it also moves in one uniform direction in each vein, viz. from the capillaries towards the heart; but although it moves in general from the arteries through the capillaries into the veins, yet its direction in any one capillary may be, and often is, altered and reversed.

Both the general velocity with which the blood moves through the whole system, and the proportional velocity of its motion in particular vessels, are constantly varying.

The force with which the blood moves in the veins, and the muscular contraction of the auricle which takes place during the relaxation of the ventricle, propels the blood into the ventricle.

When a certain quantity of blood is propelled into the ventricle, its muscular fibres contract, being probably stimulated thereto by the blood.

This contraction of the muscular fibres of the left ventricle diminishes, or obliterates it, and propels the whole, or part of the blood contained in it, into the aorta; the valve placed at the opening of the auricle into the ventricle preventing its return into the auricle.

When the ventricle has emptied itself into the aorta, it relaxes, and receives a fresh quantity of blood from the auricle; the blood being prevented from returning from the aorta by the valves placed at its opening into the heart.

The action of the heart tends to produce an equal and uniform circulation in every part of the body. Yet the circulation doth not depend on the action of the heart alone.

The circulation is not equal and uniform through the whole body; but, the same quantity of blood flowing from the heart, a greater proportion of it sometimes circulates through one part, sometimes through another.

If the heart be the sole power propelling the blood forward, the circulation can only be increased in any one part by an increase in the size of the vessel, or a removal of some obstruction to the circulation there, or a diminution of the size of the vessels, or obstruction to the circulation in the rest of the body; and *e contrario*, the circulation can only be diminished in one part by a diminution of the size of the vessels, or obstruction to the circulation there, or an increase of the size of the vessels, or a removal of some obstruction to the circulation in the other parts of the body: but it will appear, from what follows, that without any of these things happening, the circulation in a part may be diminished or increased, and therefore that the heart is not the sole propelling power.

The causes capable of increasing the circulation in a part are generally such as tend to excite muscular motion, and are called stimuli. Some part of the body brought into action by these is capable of increasing the circulation independent of the action of the heart. This force must reside in the arteries or capillaries.

The arteries are endowed with a muscular motion, by which they may increase the circulation in a particular part, or assist the heart in the general circulation of the blood; at each contraction of the heart they are distended; at each relaxation they contract.

This alternate contraction and dilatation might depend on their elasticity; but if so, their size at their utmost contraction in the living body should be equal to that produced by a fluid injected into them, with a force capable of overcoming the resistance the blood meets with in the capillary vessels, which, in the human body, is probably equal to about eight feet perpendicular height of water.

But their size, even at their utmost state of dilatation, is less than that produced by a fluid injected into them, with a force equal to one foot perpendicular height of water, when the animal is dead. Therefore their contractions and dilatations do not depend on their elasticity. Or the argument may be taken in this manner; the vessels, when of the largest size in the living body, are less than they are in the dead body; but as the elasticity remains perfect in the dead body, they could never be contracted by it in the living.

If the arteries contracted and dilated by their elasticity, no additional force could be applied from their contraction and dilatation; since the heart would lose more force in distending the arteries than they would re-apply to the blood in contracting.

If upon being distended by the blood thrown into them by the heart, they are excited to a muscular contraction, and when they have performed this contraction relax, and, like the ventricle of the heart, receive the blood easily into them, and, when they are again distended, are excited to a second contraction, they may apply an additional force to that of the heart, so as to promote the circulation through the whole body.

If such contractions and dilatations be greater in any particular part, they will promote the circulation in that part; in as much as, when they are relaxed to a greater degree, they will suffer the blood to pass through them more readily into the capillaries; and, when they contract, they will empty themselves more thoroughly into the capillaries.

The arteries have a muscular contraction and

dilatation, similar to that of the ventricles of the heart, by which they apply an additional power to that of the heart, so as to promote the general circulation through the whole body, and often to increase the proportional circulation in a particular part.

As the capillaries do not contract or dilate alternately, and as the direction of the blood in any one of them is quite undetermined, this additional force cannot depend on their action.

The motion of the blood is regulated by the action of the heart and arteries, and the contraction of the capillary vessels; and these are measured by the pulse.

The Pulse.

The indications of the pulse are of great importance in medicine; for by these we can judge of the state of the circulating system, the phenomena of diseases, the patient's strength or weakness, &c.

It indicates,	by	It is called
1. The strength of the contraction of the heart,	Strength,	Strong.
	Weakness,	Weak.
2. The quantity of blood thrown out at each contraction,	Fulness,	Full.
	Smallness,	Small.
3. The number of contractions,	Frequency,	Frequent.
	Slowness,	Slow.
4. The regularity of its action as to strength, quantity or frequency,	Regularity,	Regular.
	Irregularity,	Irregular.
	Intermission,	Intermittent
5. The strength of the action of the arteries,	Hardness,	Hard.
	Softness,	Soft.
	Redoubling,	Redoubling.
	Trembling,	Trembling.
6. The irritability of the vessels,	Quickness,	Quick.
	Regularity,	Regular.
	Slowness,	Slow.
7. The medium diameter of the arteries,	Dilatation,	Great.
	Contraction,	Small.
8. The quantity of blood in the vessels,	Oppression,	Oppressed.
	Smallness,	Empty.
9. The contraction of the capillaries,	Obstruction,	Obstructed.
	Freedom,	Free.

This table needs no explanation; yet it is in fact no easy matter, in many cases, to make the proper distinctions. In attempting to decide on the state of the pulse, it is of importance too, to know the usual pulsations of the patient when in health; as these differ materially in different subjects.

For the structure of the lungs, and their blood-vessels, as also of the exhalants and absorbents, we refer to the article ANATOMY.

Some of the lymphatics terminate in veins, which are similar in their structure to those which terminate in the thoracic duct.

Powers producing the Extravasation and Absorption of the Lymph.

The contractile power of the blood-vessels squeezes the lymph into the cellular membrane and cavities.

The quantity thrown out is in proportion to the force of the circulation, the fluidity of the substances contained in the blood-vessels, or the quantity of the more fluid substances, and the degree of contraction of the capillaries and exhalants.

The joint of a lymphatic opening into a cavity, endeavours to fill itself from that cavity by its action as a capillary tube, the valves preventing the return of the lymph from the other part of the lymphatic. In like manner, a lymphatic may fill itself entirely from the cavity in which it terminates; but its action as a capillary tube will not tend, in the smallest degree, to propel the lymph into the veins.

It is most probable, that the joint of the lymphatic, next to the cavity, having absorbed a sufficient quantity of lymph to fill it, is stimulated to contract and propel the fluid into the next joint, and so on to the thoracic duct, or vein in which it terminates; and having emptied itself, and being relaxed, it fills itself again from the cavity, and so continues to act: for there is apparently no other power in the body capable of producing a regular flow of the lymph through the lymphatics into the blood-vessels.

For in a living animal, where the veins are contracting, and pressing upon the blood, if one end of a capillary tube terminate in a vein, and the other in a cavity; and if there be no action in that tube, excepting that which arises from its being a capillary one, or from the motion of the blood in the vein; if there be any motion in that tube after it is full, it will always be from the vein into the cavity, and never from the cavity into the vein, let the tube be of any size or shape whatever.

Further; the alternate pressure of the lymphatics, arising from the alternate contractions and relaxations of the blood-vessels, or muscles, is not sufficiently powerful, universal, or equal, to produce a regular flow of the lymph through the lymphatics into the blood-vessels.

Neither does the cellular membrane and cavities force the lymph into the lymphatics, and through them into the veins.

The extravasation of fluids from the blood-vessels into the cellular membrane and cavities, and their reabsorption, generally take place in the above manner.

Sometimes the coagulable lymph is thrown out by the exhalants; and then it most commonly coagulates.

If it coagulate, it cannot be taken up by the lymphatics, till it be redissolved, which happens in many cases; and it is then absorbed much sooner than it can be rendered soluble in water, by putrefaction when out of the body. At other times it continues in the cavity for many years.

The red part of the blood is also sometimes thrown out by the exhalants. In this case, its particles are broken down probably by the first,

stage of putrefaction, and it is afterwards reabsorbed. The same things may happen, if the red particles and coagulable lymph be extravasated in consequence of the rupture of a blood-vessel.

In particular parts, as in the corpora cavernosa penis, the extravasation and absorption are probably performed in a different manner, and by different vessels.

All absorbent vessels must have a power of propelling the fluids into the blood-vessels, sufficient to overcome the force of their contraction, by which they endeavour to propel the blood out of any opening.

Properties depending on the Life.

Inanimate matter is endowed with properties peculiar to, and which distingush its different species from one another, and these are called chemical.

Figure, motion, and other accidental circumstances, may give to any species of matter indiscriminately other properties, and these are called mechanical.

Animated matter of the same species may have new or different chemical properties, or lose some of those it had when inanimate, in consequence of life, and which are immediately altered when it is deprived of it. In animated bodies, there are also powers of action, and laws of motion, different from those mechanical ones found in inanimate matter; and there are also other properties, which have no resemblance to chemical or mechanical. All these we call properties depending on life.

Heat of the Body.

The bodies of mammals have a disposition to maintain the same degree of heat nearly, and the heat of the same species is generally the same, especially in mankind.

The common heat of the human body in health is 98 degrees of Fahrenheit's thermometer. It is the same throughout the whole body, excepting that a cold substance applied to the skin diminishes its heat: and the heat of the blood, flowing from an opened vein in a limb that is exposed to a cold atmosphere, is reduced two or three degrees.

Otherwise the heat continues the same, whether that of the atmosphere, or other surrounding bodies, be greater or less than ninety-eight degrees, unless when it produces a disease, the consequence of which is an increase or diminution of the heat of the body.

The body is capable of resisting different degrees of external heat or cold, according to the habit it has acquired. There are instances of its bearing 20 degrees below 0 of Fahrenheit's thermometer, with very moderate clothing, and 115 above, without alteration. The heat may be increased or diminished by alterations in the body itself, especially in diseases. It has seldom been observed to be less than 94, or more than 110 degrees of Fahrenheit's thermometer. Mr. G. Hunter was never able to raise it higher than 99 degrees, or one degree above the natural temperature.

It is here unnecessary to enlarge on the structure of the nervous system, as we have already described it under the article ANATOMY.

Sensibility, Mobility, and Irritability.

Sensibility is a property of the body, by which applications to it excite sensations in the mind. *Mobility* is an original power of motion, by which certain parts of the body are capable of moving themselves without any external motion imprest. *Irritability* is a property of the body, by which applications to particular parts excite a motion in the moveable parts, independent of the motion imprest.

The *sensibility* depends on a part's being connected with the brain by the nerves; for, if the nerves going to any part be cut through, the sensibility is lost. If the nerves going to any part be moderately comprest, the sensibility is diminished; and if the nerves be comprest strongly, the sensibility is lost. If the pressure be soon removed, the sensibility recurs. If the pressure be continued for a long time before it is removed, the sensibility returns more slowly, or not at all.

Pressure on the brain may diminish the sensibility of the whole body. If a small branch of a nerve be cut through, so as to take off the sensibility of a part of the skin, it may be restored in time. The sensibility may be impaired, or lost, without any sensible pressure on the nerve, or alteration of its structure.

When there is no wound in the body, the sensations generally appear to be in the place where the application exciting them is made. But to this law there are many exceptions.

If an extremity be cut off, an application made to the stump may produce sensations, which appear to be in the part amputated.

A sensation may be excited apparently in a part by an affection of the nerve going to it, the body being whole. An application made to one part may excite a sensation in another, when there is no apparent communication between the nerves going to them.

Every part of the body is capable of sensation in a sound or morbid state. The bones and cartilages do not appear to be sensible in a sound state, whatever application be made to them; but in a morbid one they may become sensible. All the other parts of the body appear to be sensible in a sound state; for the distension of a part considerably beyond its present disposition to contract, either by its muscular power or elasticity, is capable of exciting sensations in every other part of the body.

There are applications which are capable of exciting sensations in one part, that produce no such effect in another.

Some of the sensible parts are only capable of sensation from distension in a sound state, such as the membranes. One part may be sensible to an application to which another is not, and the second part may be sensible to another application to which the first is not; as the effluvia of musk do not affect the eyes, although they affect the nostrils. Some parts of the body are only capable of the sensation of pain; others are capable of various sensations, of which pain is always one.

Some applications are capable of exciting pain only; others may excite various sensations. Every sensation, excited in a very great degree, is painful, and several are also painful from being very weak.

Those parts of the body which are capable of a variety of sensations are generally called the organs of the senses. These are, the skin, the mouth, the nostrils, the eyes, the ears: the stomach is capable of several sensations besides pain, but not of so great a variety as the organs of the senses. Some other parts of the body are also capable of some sensations not painful.

All the sensible parts may have their sensibility increased or diminished.

Mobility and *Irritability*.—Parts capable of original motion are called the moving parts. In many

parts capable of original motion there are red fibres called muscular fibres; but in some of the parts capable of original motion no such fibres have hitherto been demonstrated.

All the parts of the body are not capable of original motion. The muscles, blood-vessels, lymphatics, secretories of the glands, and skin, are capable of original motion.

The moving parts are capable of contracting beyond that degree of contraction which would arise from their elasticity.

All the actions of the body, and all the power which it exerts, depend upon the contraction of the moving parts.

When a muscular fibre, or any other moving part, continues in action for a considerable time, it does not in general exert one continued contraction, but a number of alternate contractions and relaxations. The relaxations, when the body is strong, or the whole strength is not exerted, are often hardly distinguishable; but when the habit is weak, or the whole force exerted, they become very apparent. A contraction may however probably continue for a very long time, without any intermediate relaxation; as a spasm.

When any motion takes place in consequence of a relaxation, it is from the elasticity or weight of the part, or from some external power.

The original motions are produced by volition, ideas of the mind, or certain external applications called stimuli.

There must be the same intercourse, which is necessary for sensation, between the moving part and the brain, by means of the nerves, to render volition capable of exciting a motion in it.

Many of the moveable parts are incapable of being put in motion by the will. The will indeed may acquire a power over a moving part, which it could not affect originally.

An idea of the mind may excite a motion independent of, and contrary to, the will, provided the part be connected with the brain by the nerves

The motions excited by the will are called voluntary motions: those excited by ideas or stimuli, independent of, or contrary to, the will, are called involuntary or spontaneous. All the parts of the human body capable of voluntary motions have red muscular fibres.

The will and ideas are both capable of producing contractions and relaxations in the moving parts.

If the communication between the brain and a moving irritable part be cut off, by cutting through the nerve, a motion may be still excited in it by a stimulus: hence stimuli may excite motion without affecting the brain; and therefore all the motions excited by them are not begun in the brain, and carried along the nerves to the moving part.

If a nerve be cut through, so as to leave a portion of it adhering to a moving part, a stimulus applied to the part of the nerve adhering may excite a motion in the moving part. Hence the action of a nerve upon a part may excite a motion in it; and the motions excited by the nerves do not all arise in the brain.

If the communication between the brain and a moving part by the nerves continue, a stimulus applied to the brain may excite a contraction of the moving part.

When a stimulus produces a contraction in a moving fibre, the force of that contraction is often far greater than the force with which the stimulus was applied. Therefore, when a stimulus excites a motion, it is not in consequence of a communication of the power employed in applying that stimulus: nay, the motion may be the very reverse of that which would have been produced by the exertion of that power.

When a stimulus, applied to a nerve, produces a contraction in a moving fibre, it is a question whether the motion is excited in the nerve, and communicated to the fibre, or produced immediately in the fibre, without any motions being excited in the nerve: for in this last there is often no apparent motion excited.

It has been conjectured by some, that the motion was communicated by a fluid flowing through the nerves as tubes; by others, that it was communicated by vibrations; and by others, that it arises from an elastic vapour surrounding the nerves*; but none of these conjectures are founded on experiment, neither are any of them any ways capable of accounting for the appearances.

If the brain be not diseased, and two parts of the body communicate with it by the nerves, as for sensation, an application made to one of these parts may excite a contraction or relaxation in the other, although none of the substance applied be carried from the one to the other, and although no sensation be excited by the stimulus. Hence a medicine, applied to one part of the body, may produce an effect upon another, although none of that medicine be carried to the part on which that effect is produced.

The effect of an application upon a part at a distance from that where it is made may be the same which it would have produced if applied to that part, or it may be the reverse, or totally unconnected with it. An application to one part may produce a motion in another, although it would have had no effect if it had been made to the part itself. A stimulus applied to a part incapable of original motion may excite a motion in a moving part at a distance.

If the communication between the brain and any part of the body, by means of the nerves, be cut off, application made to that part will not affect the other parts, nor will application to the other parts produce motions in that; unless the nerves be cut off from a muscle whose fibres have been accustomed to contract at one and the same time, such as the heart. In that case, if you stimulate one of these fibres, the whole are brought into immediate contraction; those not stimulated contract, to all appearance, as soon as the one to which the stimulus is applied.

The motions produced by the application of stimuli to moving and irritable parts are apparently the same, whether the part be connected with the brain by the nerves or not; excepting that the motions excited become more languid, after the moving part has been separated some time from the brain, and at last the power of motion in it is entirely lost in quadrupeds.

The same things are true of the motion excited by the application of stimuli to the nerves going to a moving part. Hence, it is probable, that the motions excited by the application of stimuli to a moving and irritable part, or to the nerve going to a moving part, do not arise in the brain, but immediately in the part; the brain in this case only keeping up the life of the part, and rendering it capable of motion.

The parts on which stimuli are capable of acting, so as to produce motion, are called the irritable parts. All the parts of the body are irritable in a sound state, excepting the bones, cartilages,

and tendons; and all the parts of the body may become irritable in a morbid state.

Stimuli may produce motion in a distant part, when applied to a part incapable of original motion; or, in other words, all the irritable parts are not moving parts.

An application that produces relaxation, or diminishes contraction, is called a sedative. A substance may act on one part as a stimulant, on another as a sedative: and a substance may act on one part as a stimulant or sedative, and have a less effect, or none at all, when applied to another, although otherwise equally irritable. Such stimuli are called specific.

There are some parts upon which stimuli in general produce greater effects than they do upon others. A greater number of substances act also upon these parts. The membranes, ligaments, and blood-vessels, excepting the heart, are incapable of being affected by any other stimulus but distension.

Some of the applications capable of affecting the moving parts tend to destroy the fibres by mechanical or chemical effects; some of them have no particular mechanical or chemical power of action.

The irritability and mobility of a part may be increased, diminished, or entirely lost.

Custom and Habit.

Custom is the frequent repetition of any application to the body, capable of affecting the sensible or irritable parts; or it is the repetition of any action or motion of the body. Habit is the effect of such repetition.

An application, producing a sensation, may have its power increased or diminished by custom. If the mind pays particular attention to any impression, its force and distinctness is increased. Hence arises the improvement of the eye, ear, &c. in distinguishing objects in painting, tones in music, &c. If the impressions are very strong, so as to excite great attention, their force is increased. If the impressions are not attended to, their force is diminished. Hence, after living for some time near any thing producing a great noise, the noise is scarcely heard.

The power of the will, in producing motion, may be increased by custom, and diminished by disuse. The will, in frequently producing a motion, may not only have its power increased, but it is also capable of producing that motion with greater accuracy, and by frequent attempts may acquire a power over a moving part, upon which it has naturally little or no influence. A motion may arise from a volition in consequence of custom, which was not naturally connected with it; as a man in turning a lathe does not will the motion of his hand, but that of the end of the chisel. Quere, Can a man produce two distinct motions by his will at once; or, when two distinct motions are produced, does the will produce them successively? the impression arising from one volition remaining till the mind renews it, after having produced the other, in the same manner as the impression of a flame making a circular motion, remains on the eye, so as to give an idea of a complete circle.

The power of producing two distinct motions, apparently at the same time, is greatly increased by custom, and hence arises the facility of execution acquired by custom.

The power of an idea in exciting motion may be increased or diminished by custom. An idea strongly imprest on the mind is for the most part more powerful in exciting a motion, than one weakly imprest. The power of an application in impressing an idea, may be increased or diminished by custom, as is above described, and of consequence the power of an idea in exciting motion.

Supposing the impression on the mind the same, if an idea has frequently produced a motion, its power is increased. On the contrary, if an idea has been often excited, and if the motion depending upon it has by any means been prevented, its power is diminished or lost.

The action of an application producing, diminishing, or altering the mode of contraction of a moving part, and which at the same time has no effect on the mind, may be increased or diminished by custom. If it be often applied, so as always to produce its effect, its power, or the certainty of its action, is for the most part increased.

An application of an equal apparent force does not always produce the same effect. If the same quantity of ipecacuanha be twice exhibited at the interval of several days, it may vomit at the first exhibition, and not at the second; or it may produce vomiting at the second exhibition, and not at the first.

In applying medicines, which do not act as simple stimuli, their particular effect cannot be increased by increasing the dose, they being converted into simple stimuli. Thus small doses of saccharum saturni produce costiveness, but a very large dose frequently purges. There is a maximum in the dose of all medicines, so that if they be exhibited in greater quantity their effects are lost instead of being increased.

An application frequently repeated, so as to produce its proper effect, often becomes more constant and uniform in its action, although it may become necessary that it should be applied in a greater degree: thus,

If an evacuating medicine be repeatedly exhibited, it generally requires a larger dose at the second, and some of the subsequent exhibitions, to produce the same effect as the first; but if these produce the effect, the power of the medicine is afterwards increased.

The more violent the effect of any application, the more is its power increased by repetition. If an application be made in so small a degree as not to produce any effect, or if its effects are by any means counteracted, its power is diminished or lost. The repeated application of some medicines in any circumstance diminishes their powers.

All the natural powers of action in the body are increased by frequent exertion. If two or more fibres have been accustomed to contract together, either by the action of the will, by an idea, or by stimuli; or if the contraction in one of them be produced by the will, while the other is brought into action at the same time by a stimulus, the producing of a contraction in the one by an application to it alone, will produce a contraction in the other. If they be fibres of the same muscle, and acted upon by a stimulus, this will happen after the communication with the brain by the nerves is cut off. If, after this habit is acquired, one of these fibres is made to contract frequently, while the other is prevented from contracting, the habit will be lost or destroyed. If any motion, or state of the body, be repeated at a particular period of time, it will often return at that period, although no other cause be applied but the habit acquired.

A habit may be destroyed by counteracting and preventing its effects. Two habits may be so connected, that preventing the one from taking place

may prevent the effects of the other. Custom has also a powerful influence on the mind.

Exercise, Rest, and Sleep.

When a moving part is brought into action by the will, an idea or stimulus, that action sometimes ceases upon removing the cause, sometimes it continues after the cause is removed. This last frequently happens in the production of diseases. But when it is necessary for the continuation of an action that its cause should be continually or repeatedly applied, the original power seems gradually to be exhausted, so that the motions for the most part become gradually weaker, and at last are not to be produced, as in the case of exercise.

There are some actions which are necessary for life, that are continued by the application of stimuli, and nevertheless do not apparently exhaust the original power; such as the action of the heart, the peristaltic motion of the intestines, &c. If these actions be increased beyond their common pitch, or beyond what can be allowed by the present strength of the system, they also exhaust the original power. Thus, a great exertion of the faculties of the mind also, exhausts its powers. Rest however restores both to the body and mind their powers of action.

In perfect sleep, both the body and mind are at rest, excepting in those particulars where an exertion is necessary to life. These exertions are in the alternate contractions of the heart and arteries, the motion of the muscles in respiration, the tone of the muscular fibres, blood-vessels, and other moving parts, the action of the lymphatics and secretory and excretory ducts of glands, the peristaltic motion of the intestines, &c. The common exertions of the body and mind, when a man is awake, exhaust to such a degree, as to require that rest which is found in sleep, to allow the original power to recruit itself.

In sleep the mind is often brought into action, sometimes from affections of its own, sometimes from affections of the body. The body also often exerts other powers besides those necessary for life. In these cases the original power is less recruited, and that in proportion to the exertion.

Although the original power may be so far exhausted as to require to be recruited by sleep, that state may nevertheless be prevented by any thing exciting great attention of the mind, by applications to the body producing uneasiness or pain, or by an increased action of any of its parts, or by any action or contraction which continues after its cause is removed.

Though rest is not complete at first, it has a tendency to become so during the progression of sleep. During which also the original power appears to be so much accumulated, as to give a disposition to action both in the mind and body, whence sleep goes off, or the general frame awakes.

A continued or strong action of one part of the body may not only exhaust the original power in that part, but also in all others. It may also exhaust the powers of the mind; *e contrario* a great exertion of the powers of the mind may exhaust those of the body.

A moderate exertion of the powers of the body and mind, whether separately or conjointly, tends to strengthen the whole system; but violent and continued exertion, and especially if not recruited by rest and sleep, may weaken so as to destroy.

Man differs from all other animals in this, that while the rest have their faculties as perfect as they are ever intended to be from the first, in man they are but just sufficient for his existence; and it is left to himself to procure faculties, both of the body and mind, by proper exercise, by which he may excel all other animals in every power, inhabit the whole earth, and improve the powers of other animals for his own.

PART III.

Nosology.

Every deviation from health, or from that general order and harmony between organ and organ, function and function, which we have just noticed, constitutes a disease. It is obvious that such deviations may vary almost to infinitude, and hence that diseases may vary in their different seats and modifications to an almost infinite extent. The study of these constitutes the scope of medicine; and as the Greek term for disease is νοσος *(nosos)*, this peculiar branch of medical study has been usually denominated *nosology*.

Now in order to reduce the practice of medicine to something definite, to simplify what was perplexed, and to lay down certain general rules for a more accurate investigation of diseases, physicians in all ages have attempted to arrange these last into a systematic form or classification; the principles of which, derived from their respective durations, supposed modes of action, situations or sexes, have been so numerous, that it is impossible for us to do more than give a rapid glance at those which have excited most attention in our own times, and which appear to be the six following:

Nosological Arrangement of Cullen.

CLASS I. PYREXIÆ.

Order I. Febres.—Genera 6.
Order II. Phlegmasiæ.—Genera 18.
Order III. Exanthemata.—Genera 10.
Order IV. Hæmorrhagiæ.—Genera 4.
Order V. Profluvia.—Genera 2.

CLASS II. NEUROSES.

Order I. Comata.—Genera 2.
Order II. Adynamiæ.—Genera 4.
Order III. Spasmi.—Genera 17.
Order IV. Vesaniæ.—Genera 4.

CLASS III. CACHEXIÆ.

Order I. Marcores.—Genera 2.
Order II. Intumescentiæ.—Genera 13.
Order III. Impetigines.—Genera 8.

CLASS IV. LOCALES.

Order I. Dysæsthesiæ.—Genera 9.
Order II. Dysorexiæ.—Genera 9.
Order III. Dyscinesiæ.—Genera 7
Order IV. Apocenoses.—Genera 6.
Order V. Epischeses.—Genera 5.
Order VI. Tumores.—Genera 14.
Order VII Ectopiæ.—Genera 3.
Order VIII. Dialyses.—Genera 7.
Total number of Genera 150.

Nosological Arrangement of Sauvages.

CLASS I. VITIA.

Order I. Maculæ.—Genera 6.
Order II. Efflorescentiæ.—Genera 4.
Order III. Phymata.—Genera 12.
Order IV. Excrescentiæ.—Genera 9.
Order V. Cystides.—Genera 10.
Order VI. Ectopiæ.—Genera 4.
Order VI. Ectopiæ.—Genera 17.
Order VII. Plagæ.—Genera 16.

CLASS II. FEBRES.

Order I. Continuæ.—Genera 5.
Order II. Remittentes.—Genera 3.
Order III. Intermittentes.—Genera 4.

CLASS III. PHLEGMASIÆ.

Order I. Exanthematicæ.—Genera 10.
Order II. Membranaceæ.—Genera 8.
Order III. Parenchymatosæ.—Genera 7.

CLASS IV. SPASMI.

Order I. Tonici Partiales —Genera 6.
Order II. Tonici Generales.—Genera 2.
Order III. Clonici Partiales.—Genera 8.
Order IV Clonici Generales.—Genera 6.

CLASS V. ANHELATIONES.

Order I. Spasmodicæ.—Genera 5.
Order II. Oppressivæ.—Genera 9.

CLASS VI. DEBILITATES.

Order I. Dysæsthesiæ.—Genera 10.
Order II. Anepithymiæ.—Genera 3.
Order III. Dyscinesiæ.—Genera 7.
Order IV. Leipopsychiæ.—Genera 4.
Order V. Comata.—Genera 7.

CLASS VII. DOLORES.

Order I. Vagi.—Genera 10.
Order II. Capitis.—Genera 6.
Order III. Pectoris.—Genera 3.
Order IV. Abdominales Interni.—Genera 8.
Order V. Externi et Artuum.—Genera 6.

CLASS VIII. VESANIÆ.

Order I. Hallucinationes.—Genera 6.
Order II. Morositates —Genera 10.
Order III. Deliria.—Genera 5.
Order IV. Vesaniæ Anomalæ.—Genera 2.

CLASS IX. FLUXUS.

Order I. Sanguifluxus.—Genera 7.
Order II. Alvifluxus.—Genera 12.
Order III. Serifluxus.—Genera 14.
Order IV. Ærifluxus.—Genera 3.

CLASS X. CACHEXIÆ.

Order I. Macies.—Genera 4.
Order II. Intumescentiæ.—Genera 6.
Order III. Hydropes Partiales.—Genera 9.
Order IV. Tubera.—Genera 6.
Order V. Impetigines.—Genera 6.
Order VI. Icteritiæ.—Genera 4.
Order VII. Cachexiæ Anomalæ.—Genera 6.
Total number of Genera 315.

Nosological Arrangement of Linnéus.

CLASS I. EXANTHEMATICI.

Order I. Contagiosi —Genera 6.
Order II. Sporadici.—Genera 3.
Order III. Solitarii.—Genera 1.

CLASS II. CRITICI.

Order I. Continentes.—Genera 4.
Order II. Intermittentes.—Genera 5.
Order III. Exacerbantes.—Genera 5.

CLASS III. PHLOGISTICI.

Order I. Membranacei.—Genera 7.
Order II. Parenchymatici.—Genera 7.
Order III. Musculosi.—Genus 1.

CLASS IV. DOLOROSI.

Order I. Intrinseci.—Genera 20.
Order II. Extrinseci.—Genera 5.

CLASS V. MENTALES.

Order I. Ideales.—Genera 7.
Order II. Imaginarii.—Genera 6.
Order III. Pathetici.—Genera 12.

CLASS VI. QUIETALES.

Order I. Defectivi.—Genera 6.
Order II. Soporosi.—Genera 10.
Order III. Privativi.—Genera 15.

CLASS VII. MOTORII.

Order I. Spastici.—Genera 10.
Order II. Agitatorii.—Genera 10.
Order II. Agitatorii.—Genera 5.

CLASS VIII. SUPPRESSORII.

Order I. Suffocatorii.—Genera 18.
Order II. Constrictorii.—Genera 8.

CLASS IX. EVACUATORII.

Order I. Capitis.—Genera 6.
Order II. Thoracis.—Genera 4.
Order III. Abdominis.—Genera 14.
Order IV. Genitalium com.—Genera 6.
Order IV. Genitalium fœm.—Genera 5.
Order V. Corporis Externi.—Genera 2.

CLASS X. DEFORMES.

Order I. Emaciantes.—Genera 5.
Order II. Tumidosi.—Genera 8.
Order III. Decolores.—Genera 5.

CLASS XI. VITIA.

Order I. Humoralia.—Genera 9.
Order II. Dialytica.—Genera 14.
Order III. Exulcerationes.—Genera 13.
Order IV. Scabies.—Genera 19.
Order V. Tumores Protuberantes.—Genera 10.
Order VI. Procidentiæ.—Genera 8.
Order VII. Deformationes.—Genera 18.
Order VIII. Maculæ.—Genera 9.
Total number of Genera 326.

Nosological Arrangement of Vogel.

CLASS I. FEBRES.

Order I. Intermittentes.—Genera 14.
Order II. Continuæ.—Genera 66.

CLASS II. PROFLUVIA.

Order I. Hæmorrhagiæ.—Genera 17.
Order II. Apocenoses.—Genera 28.

CLASS III. EPISCHESES.

Genera 8.

CLASS IV. DOLORES.

Genera 46.

CLASS V. SPASMI.

Genera 42.

CLASS VI. ADYNAMIÆ.

Genera 63.

CLASS VII. HYPÆRESTHESES.

Genera 19.

CLASS VIII. CACHEXIÆ.

Genera 25.

CLASS IX. PARANOIÆ.

Genera 12.

CLASS X. VITIA.

Order I. Inflammationes.—Genera 10.
Order II. Tumores.—Genera 65.
Order III. Extuberantiæ.—Genera 15.
Order IV. Pustulæ and Papulæ.—Genera 10.
Order V. Maculæ.—Genera 14.
Order VI. Dissolutiones.—Genera 39.
Order VII. Concretiones.—Genera 7.

CLASS XI. DEFORMITATES.

Genera 50.
Total number of Genera 560.

Nosological Arrangement of Sagar.

CLASS I. VITIA.

Order I. Maculæ.—Genera 5.
Order II. Efflorescentia.—Genera 10.
Order III. Phymata.—Genera 12.
Order IV. Excrescentiæ.—Genera 7.
Order V. Cystides.—Genera 10.
Order VI. Ectopiæ.—Genera 27.
Order VII. Deformitates.—Genera 6.

CLASS II. PLAGÆ.

Order I. Solutiones.—Recentes, Cruentæ.—Genera 7.
Order II. Solutiones.—Recentes, Cruentæ, Artificiales.—Genera 4.
Order III. Solutiones.—Incruentæ.—Genera 7.
Order IV. Solutiones.—Anomalæ.—Genera 4.

CLASS III. CACHEXIÆ.

Order I. Macies.—Genera 5.
Order II. Intumescentiæ.—Genera 7.
Order III. Hydropes.—Partiales.—Genera 8.
Order IV. Tubera.—Genera 6.
Order V. Impetigines.—Genera 6.
Order VI. Icteritiæ.—Genera 4.
Order VII. Anomale.—Genera 6.

CLASS IV. DOLORES.

Order I. Vagi.—Genera 10.
Order II. Capitis.—Genera 6.
Order III. Pectoris.—Genera 2.
Order IV. Abdominis.—Genera 7.
Order V. Externarum.—Genera 7.

CLASS V. FLUXUS.

Order I. Sanguifluxus.—Genera 7.
Order II. Alvifluxus.—Sanguinolenti.—Genera 4.
Order III. Alvifluxus.—Non Sanguinolenti.—Genera 9.
Order IV. Serifluxus.—Genera 13.
Order V. Æerifluxus.—Genera 3.

CLASS VI. SUPPRESSIONES.

Order I. Egerendorum.—Genera 6.
Order II. Ingerendorum.—Genera 2.
Order III. Imi Ventris.—Genera 4.

CLASS VII. SPASMI.

Order I. Tonici Partiales.—Genera 6.
Order II. Tonici Generales.—Genera 2.
Order III. Clonici Partiales.—Genera 9.
Order IV. Clonici Generales.—Genera 6.

CLASS VIII. ANHELATIONES.

Order I. Spasmodicæ.—Genera 5.
Order II. Suppressivæ.—Genera 8.

CLASS IX. DEBILITATES.

Order I. Dysæsthesiæ.—Genera 10.
Order II. Anepithymiæ.—Genera 3.
Order III. Dyscinesiæ.—Genera 7.
Order IV. Leipopsychiæ.—Genera 4.
Order V. Comata.—Genera 7.

CLASS X. EXANTHEMATA.

Order I. Contagiosa.—Genera 6.
Order II. Non Contagiosa.—Genera 4.

CLASS XI. PHLEGMASIÆ.

Order I. Musculosæ.—Genera 4.
Order II. Membranaceæ.—Genera 7.
Order III. Parenchymatosæ.—Genera 6.

CLASS XII. FEBRES.

Order I. Continuæ.—Genera 5.
Order II. Remittentes.—Genera 3.
Order III. Intermittentes.—Genera 4.

CLASS XIII. VESANIÆ.

Order I. Hallucinationes.—Genera 6.
Order II. Morositates.—Genera 11.
Order III. Deliria.—Genera 5.
Order IV. Anomalæ.—Genera 2.
Total number of Genera 351.

Nosological Arrangement of Darwin.

CLASS I. DISEASES OF IRRITATION.

ORDER I. *Increased Irritation.*

Gen. With increased actions of the sanguiferous system.—Species 5.
2. —— of the secerning system.—Species 19.
3. —— of the absorbent system.—Species 14.
4. —— of other cavities and membranes.—Species 15.

ORDER II. *Decreased Irritation.*

1. With decreased action of the sanguiferous system.—Species 19.
2. —— of the secerning system.—Species 20.
3. —— of the absorbent system.—Species 27.
4. —— of other cavities and membranes.—Species 19.
5. —— of the organs of sense.—Species 10.

ORDER III. *Retrograde irritative Motions.*

1. Of the alimentary canal.—Species 11.
2. Of the absorbent system.—Species 11.
3. Of the sanguiferous system.—Species 3.

CLASS II. DISEASES OF SENSATION.

ORDER I. *Increased Sensation.*

1. With increased action of the muscles.—Species 13.
2. With the production of new vessels by internal membranes or glands with fever.—Species 19.
3. —— by external membranes or glands with fever.—Species 20.
4. —— by internal membranes or glands without fever.—Species 18.
5. —— by external membranes or glands without fever.—Species 13.
6. With fever subsequent to the production of new vessels or fluids.—Species 17.
7. With increased action of the organs of sense.—Species 10.

ORDER II. *Decreased Sensation.*

Gen. 1. With decreased action of the general system.—Species 3.

2. —— of particular organs.—Species 7.

ORDER III. *Retrograde sensitive Motions.*

1. Of the secretory ducts.—Species 3.

CLASS III. DISEASES OF VOLITION.

ORDER I. *Increased Volition.*

1. With increased action of the muscles.—Species 15.

2. —— of the organs of sense.—Species 25.

ORDER II. *Decreased Volition.*

1. With decreased action of the muscles.—Species 17.

2. —— of the organs of sense.—Species 3.

CLASS IV. DISEASES OF ASSOCIATION.

ORDER I. *Increased associate Motions.*

1. Catenated with irritative motions.—Species 8.

2. —— with sensitive motions.—Species 19.

3. —— with voluntary motions.—Species 6.

4. —— with external influences.—Species 7.

ORDER II. *Decreased associate Motions.*

1. Catenated with irritative motions.—Species 19.

2. —— with sensitive motions.—Species 14.

3. —— with voluntary motions.—Species 8.

4. —— with external influences.—Species 11.

ORDER III. *Retrograde associate Motions.*

1. Catenated with irritative motions.—Species 8.

2. —— with sensitive motions.—Species 7.

3. —— with voluntary motions.—Species 3.

4. —— with external influences.—Species 4.

Our remarks upon these different arrangements must be cursory. That of Vogel's would appear at first sight to be the fullest, as comprising not less than five hundred and sixty distinct genera of diseases; and that of Cullen's the least complete, as extending to not more than a hundred and fifty: but when it is reflected upon that nearly five parts out of six of the distinct genera of Vogel are regarded as mere species of other genera by Cullen, and arranged accordingly, the latter must at once be allowed to be equally full, and to possess a high advantage in point of simplicity. Sagar's is the most numerous next to Vogel's; and like Vogel's it is numerous not from the possession of additional matter, but extending to distinct genera, diseases of the same genus, and which ought to rank merely as separate species, or even varieties. In the general arrangement of these nosologists we perceive a considerable resemblance to that of Sauvages: their classes, though differently disposed, are nearly alike as well in name as in number; yet Sauvages' is the most simple, at the same time that it is the most comprehensive. The arrangement of Linnæus is like all his arrangements, neat and classical; perhaps the most classical of the whole of those now before us. His system is in a great measure his own: he has however more classes and genera, but fewer orders than Sauvages; and it is not always that the terms of his classes are sufficiently characteristic of the diseases that rank under them. Many of those that are disposed under the class *quicktales*, for example, are as much diseases of the mind, as several that are placed immediately under the class *mentales*; and we are afraid that the term *dolorosi*, peculiarly applied to class IV. is just as applicable to a great multitude of diseases distributed under other classes as it is to the tribe which is thus connectively arranged.

Of Dr. Cullen's table it is obvious that its chief features are due to himself alone; his classes are for the most part simple, and at the same time comprehensive; his orders are natural, and his genera ably disposed. The most objectionable of his classes is the last, or that entitled *locales*, which, like the *cryptogamia* of Linnæus's botanical system, is a mere appendix for the purpose of comprehending whatever could not conveniently be disposed under the previous heads. There is also some confusion as to a few of his orders, and we may here enumerate *profluvia* in class I., compared with *apocenoses* in class IV. since the former is only a Latin and the latter a Greek word of the same meaning, and since the diseases in the former order are only distinct genera of the latter in many instances; and some doubt as to the situation of several of his genera. Nevertheless, it is upon the whole the best division that has hitherto appeared, and is far more generally studied and lectured from than any other.

The arrangement of Dr. Darwin is more entirely his own than that of any of the nosologists; it has also the merit of being at once concise and comprehensive. But upon minute examination, and especially upon any attempt to act upon it in practice, its conciseness and comprehensiveness will be found its greatest inconveniences: for several of its classes, orders, and even genera, include diseases which can only be brought together under the peculiar theory which constitutes the basis of the arrangement; many parts of which, moreover, to say the least of them, are of very doubtful foundation. He has also enlisted into his nosology many changes in the animal body which cannot fairly be regarded as of a morbid character, as *cicatrix vulnerum*, healing of ulcers, class I. ord. i. gen. 3. *Parturitio*, parturition, class II. ord. i. gen. 1. *Risus*, laughter, III. i. 1. *Sympathia aliena*, Pity, III. i. 2. *Vita ovi*, life of an egg, IV. i. 4.

The species of this writer are for the most part the genera of other nosologists; while his genera may be compared to their division of orders, and his orders to a subdivision of classes.

The nomenclature adopted to discriminate the different genera of the arrangements now offered, though they differ occasionally, do not differ generally. It is impossible for us however to copy the general names, much less the species employed under each of these several arrangements, for this would occupy far more space than we can allot. We shall therefore select Dr. Cullen's synopsis, as the best and most approved specimen, and confine ourselves to this alone.

Dr. Cullen's Synopsis.

CLASS I. Pyrexiæ. A frequent pulse coming on after an horror; considerable heat; many of the functions injured; the strength of the limbs especially diminished.

ORDER I. Febres. Pyrexia without any primary local affection, following languor, lassitude, and other symptoms of debility.

Sect. I. Intermittentes. Fevers arising from the miasma of marshes; with an apyrexia, or at least a very evident remission; but the disease returns

constantly, and for the most part with a horror or trembling. There is only one paroxysm in a day.

Genus I. Tertiana. Similar paroxysms at an interval of about 48 hours, coming on most commonly at mid-day. A tertian hath either;

I. An apyrexia interposed;

1. Varying the duration of the paroxysms.

A. The tertian whose paroxysms are not extended beyond 12 hours.

B. The tertian with paroxysms extended beyond 12 hours.

2. Varying in the return of the paroxysms.

C. The tertian returning every day with unequal paroxysms alternately similar to one another.

D. The tertian returning every third day with two paroxysms on the same day.

E. The tertian returning every day, with two paroxysms on every third day, and only one on the intermediate ones.

F. The tertian returning every day, with a notable remission interposed between the odd and the even days, but a less remarkable one between the even and the odd one.

3. Varying in its symptoms.

G. The tertian accompanied with a disposition to sleep.

H. Accompanied with spasms and convulsive motions.

I. Accompanied with an efflorescence on the skin.

K. With phlegmasia.

4. Varying in being complicated with other diseases.

5. Varying as to its origin.

II. With the interposition only of a remission between the paroxysms.

Genus II. Quartana. Similar paroxysms, with an interval of about 72 hours, coming on in the afternoon.

I. With the interposition of an apyrexia.

1. Varying in the type.

A. The quartan with single paroxysms, returning every fourth day, none on the other days.

B. With two paroxysms every fourth day, and none on the other days.

C. With three paroxysms every fourth day, and none on the intermediate days.

D. Of the four days having only the third free from fever, with similar paroxysms every fourth day.

E. The quartan coming on every day, with similar paroxysms every fourth day.

2. Varying in its symptoms.

3. Varying in being complicated with other diseases.

II. With a remission only between the paroxysms.

Genus III. Quotidiana. Similar paroxysms with an interval of about 24 hours, coming on in the morning.

I. With the interposition of an apyrexia.

1. Varies in being solitary.

A. Universal.

B. Partial.

2. Complicated with other diseases.

II. With a remission only between the paroxysms.

Sect. II. Continuæ. Fevers without any intermission, and not occasioned by marsh miasmata; attended with exacerbations and remissions, though not very remarkable.

Genus IV. Synocha. Great heat; a frequent, strong, and hard pulse; high-coloured urine; the functions of the sensorium a little disturbed.

Genus V. Typhus. A contagious disease; the heat not greatly above the natural; the pulse small, weak, and for the most part frequent; the urine little changed; the functions of the sensorium very much disturbed, and the strength greatly diminished.

The species are,

I. Typhus petechialis. Typhus for the most part with petechiæ.

Varying in degree. 1. Mild typhus. 2. Malignant typhus.

II. Typhus icterodes. Typhus with a yellowness of the skin.

Genus VI. Synochus. A contagious disease. A fever composed of a synocha and typhus; in the beginning a synocha, but towards the end a typhus.

Order II. Phlegmasiæ. A synocha fever, with inflammation or topical pain, the internal function of the part being at the same time injured; the blood covered with size.

Genus VII. Phlogosis. Pyrexia; redness, heat, and painful tension, of some external part.

The species are,

I. Phlogosis (phlegmone) of a vivid red colour; a swelling well defined, for the most part elevated to a point, and frequently degenerating into an abscess, with a beating or throbbing pain.

The variations are, 1. In the form. 2. In the situation.

II. Phlogosis (erythema) of a reddish colour, vanishing by pressure; of an unequal and creeping circumference, with scarce any swelling; ending in the scaling off the cuticle, in phlyctenæ, or blisters.

The variations are, 1. In the degree of violence. 2. In the remote cause. 3. In being complicated with other diseases.

The consequences of phlogosis are, an imposthume, gangrene, sphacelus.

Genus VIII. Ophthalmia. A redness and pain of the eye, with an inability to bear the light; for the most part with an effusion of tears.

The species and varieties of the ophthalmia are,

I. Idiopathic.

1. Ophthalmia (membranarum) in the tunica adnata, and the membranes lying under it, or the coats of the eye.

A. Varying in the degree of the external inflammation.

B. In the internal coats affected.

2. Ophthalmia (tarsi) of the eye-lids, with swelling, erosion, and glutinous exsudation.

II. Symptomatic.

1. From a disease of the eye itself.

2. From diseases of other parts, or of the whole body.

Genus IX. Phrenitis. Violent pyrexia; pain of the head; redness of the face and eyes; inability to endure the light or any noise; watchfulness; a fierce delirium, or typhomania.

I. Idiopathic.

II. Symptomatic.

Genus X. Cynanche. Pyrexia sometimes inclining to a syphus; difficulty of swallowing and breathing; with a sensation of narrowness in the fauces.

The species are,

I. Cynanche (tonsillaris) affecting the mucous membrane of the fauces, but especially the tonsils, with redness and swelling, accompanied with a synocha.

II. Cynanche (maligna) affecting the tonsils and mucous membrane of the fauces with swelling, redness, and mucous crusts of a whitish or ash-colour, creeping, and covering ulcers; with a typhous fever and exanthemeta.

III. Cynanche (treachealis), attended with difficult respiration, noisy and hoarse inspiration, loud cough, without any apparent tumour in the fauces, somewhat difficult deglutition, and a synocha.

IV. Cynanche (pharingæa), attended with redness in the bottom of the fauces, very difficult and painful deglutition, respiration sufficiently free, and a synocha.

V. Cynanche (parotidæa), with great swelling of the parotids and maxillary glands appearing on the outside: the respiration and deglutition but little injured; a synocha, for the most part mild.

Diseases of this genus are symptomatic, either from external or internal causes.

Genus XI. Pneumonia. Pyrexia, with a pain in some part of the thorax, difficult respiration, and cough. The species are,

I. Peripneumony, with a pulse not always hard, but sometimes soft; an obtuse pain of the breast; the respiration always difficult; sometimes the patient cannot breathe unless in an upright posture; the face swelled, and of a livid colour; the cough for the most part moist, frequently bloody.

1. Simple idiopathic peripneumonies.

Varying in degree.

2. Idiopathic peripneumonies complicated with fever.

3. Symptomatic peripneumonies.

II. Pleurisy, with a hard pulse; for the most part attended with a pungent pain of one side, augmented chiefly during the time of inspiration; an uneasiness when lying on the side; a most painful cough, dry in the beginning of the disease, afterwards moist, and frequently bloody.

1. Simple idiopathic pleurisies.

2. Pleurisies, complicated (1.) With fever. (2.) With catarrh.

3. Symptomatic pleurisies.

4. False pleurisies.

The consequences of pleurisy are a vomica or empyema.

Genus XIII. Carditis. Pyrexia; pain about the heart; difficulty of breathing; cough; unequal pulse; palpitation of the heart, and fainting.

I. Idiopathic.

II. Symptomatic.

Genus XIV. Peritonitis. Pyrexia; pain of the belly, exasperated by an upright posture, without the proper signs of other abdominal phlegmasiæ. If the diagnostics of the following diseases are given, they may be reckoned as so many species of this genus.

I. Peritonitis (propria), situated in the peritonæum, properly so called, surrounding the inside of the abdomen.

II. Peritonitis (omentalis), in the peritonæum extended through the omentum.

III. Peritonitis (mesenterica), in the peritonæum spread through the mesentery.

Genus XV. Gastritis. Pyrexia inclining to a typhus; anxiety; pain and heat of the epigastrium, augmented when any thing is taken into the stomach; an inclination to vomit, and an immediate rejection of every thing swallowed; an hickup.

I. Idiopathic.

2. From internal causes.

A. Gastritis (phlegmonodæa), attended with, acute pain and violent pyrexia.

2. From internal causes.

B. Gastritis (erysipelatosa), with a less violent fever and pain; an erysipelatous redness appearing on the fauces.

II. Symptomatic.

Genus XVI. Enteritis. Pyrexia of a typhous nature; pungent pain of the belly, stretching and twisting round the navel; vomiting; the belly obstinately bound.

I. Idiopathic.

1. Enteritis (phlegmonodæa), with acute pain, violent fever, vomiting, and constipation of the belly.

2. Enteritis (erysipelatosa), with less acute fever and pain, without vomiting; but accompanied with a diarrhœa.

II. Symptomatic.

Genus XVII. Hepatitis. Pyrexia; tension and pain of the right hypochondrium; sometimes pungent like that of a pleurisy, but more frequently obtuse; a pain reaching to the clavicle and top of the right shoulder; a difficulty of lying on the left side; dyspnœa; dry cough, vomiting, and hickup.

Genus XVIII. Splenitis. Pyrexia; tension, heat, and swelling of the left hypochondrium, the pain increasing by pressure; without the signs of nephritis.

Genus XIX. Nephritis. Pyrexia; pain in the region of the kidney, often following the course of the ureter; frequent making of water, either thin and colourless, or very red; vomiting; stupor of the thigh; with a retraction or pain of the testicle of the same side. The species are,

I. Idiopathic. Spontaneous.

II. Symptomatic.

Genus XX. Cystitis. Pyrexia; pain and swelling of the hypogastrium; frequent and painful making of water, or ischuria; and tenesmus. The species are,

I. Those arising from internal causes.

II. Those from external causes.

Genus XXI. Hysteritis. Pyrexia; heat, tension, swelling, and pain of the hypogastrium; the os uteri painful when touched; vomiting.

Genus XXII. Rheumatismus. A disease arising from an external and frequently very evident cause: pyrexia; pain about the joints, frequently pursuing the course of the muscles; infesting the knees and other large joints rather than those of the feet or hands; increased by external heat.

The species are either idiopathic or symptomatic. The former varies in situation.

A. In the muscles of the loins.

B. In the muscles of the coxendix.

C. In the muscles of the breast.

Genus XXIII. Odontalgia; a rheumatism of the jaws from a caries of the teeth.

Genus XXIV. Podagra. An hereditary disease, arising without any evident external cause, but for the most part preceded by an unusual affection of the stomach; pyrexia; pain of a joint, for the most part of the great toe of the foot, at least infesting chiefly the wrists and ankles; returning by intervals; and often alternated with affections of the stomach and other internal parts.

I. Podagra (regularis), with a pretty violent inflammation of the joints remaining for some days, and by degrees going off with swelling, itching, and desquamation of the affected part.

II. Podagra (atonica), with an atony of the stomach, or some other internal part; and either without the usual inflammation of the joints, or only with slight and wandering pains; and frequently alternated with dyspepsia, or other symptoms of atony.

III. Podagra (retrograda), with the inflammation of the joints suddenly receding, and an atony of the stomach and other parts immediately following.

IV. Podagra (aberrans), with the inflammation

of an internal part either preceding or not, and suddenly receding; with an inflammation of the joints.

Genus XXV. Arthropuosis. Deep, obtuse, and long-continued pains of the joints or muscular parts, frequently following contusions; with either no swelling, or a moderate and diffused one; no phlogosis; pyrexia, at first gentle, afterwards hectic, and at length an imposthume.

ORDER III. Exanthemata. Contagious diseases; affecting a person only once in their life; beginning with fever; after a certain time appear phlogosis, for the most part small and in inconsiderable number, and dispersed over the skin.

Genus XXVI. Erysipelas. A synocha of two or three days, for the most part attended with drowsiness, often with a delirium. In some part of the skin, most frequently the face, appears a phlogosis erythema. (G. VII. Sp. 2.) The species are,

I. Erysipelas (vesiculosum), with erythema, redness creeping, occupying a large space, and in some parts ending in large blisters.

II. Erysipelas (phlyctenodes), with an erythema formed of a number of papulæ, chiefly occupying the trunk of the body, ending in phlyctenæ or small blisters.

The disease is also symptomatic.

Genus XXVII. Pestis. An exceedingly contagious typhus, with the highest debility. On an uncertain day of the disease buboes and carbuncles break forth. It is various in degree, but the species are uncertain.

Genus XXVIII. Variola; a contagious synocha, with vomiting, and pain on pressing the epigastrium. On the third day begins, and on the fifth is finished, the eruption of inflammatory pustules, which suppurate in the space of eight days, and at last go off in crusts; frequently leaving depressed cicatrices or pockpits in the skin. The species are,

I. Variola (discreta), with few, distinct, turgid pustules, having circular bases; the fever ceasing immediately after the eruption.

II. Variola (confluens), with numerous, confluent, irregularly shaped pustules, flaccid, and little elevated; the fever remaining after the eruption.

Genus XXIX. Varicella. Synocha; papulæ breaking out after a short fever, similar to those of the small pox, but hardly ever coming to suppuration; after a few days going off in small scales, but never leaving any mark.

Genus XXX. Rubeola. A contagious synocha, with sneezing, epiphora, and dry hoarse cough. On the fourth day, or a little later, break forth small, clustered, and scarce elevated papulæ; after three days going off in very small branny scales.

I. Rubeola (vulgaris), with very small confluent, corymbose papulæ, scarce rising above the skin.

Varying,

1. In the symptoms being more severe, and the course of the disease less regular.

2. In being accompanied with a quinsey.

3. With a putrid diathesis.

II. Rubeola (variolodes), with distinct papulæ, raised above the skin.

Genus XXXI. Miliaria. Synochus with anxiety, frequent sighing, fœtid sweat, and points on the skin. On an uncertain day of the disease, break out red, small, distinct papulæ, spread over the whole body as well as the face; the apices of which, after one or two days, become very small white pustules, remaining for a short time.

Genus XXXII. Scarlatina. A contagious synocha. On the fourth day of the disease the face swells a little; at the same time an universal redness occupies the skin in large spots, at length running together; after three days going off in branny scales; frequently succeeded by an anasarca. The species are,

I. Scarlatina (simplex), not accompanied with cynanche.

II. Scarlatina (cynanchica), with an ulcerous cynanche.

Genus XXXIII. Urticaria. An amphemerina fever. On the second day of the disease, red spots resembling the stinging of nettles, almost vanishing during the day, but returning in the evening with the fever, and after a few days going off altogether in very small scales.

Genus XXXIV. Pemphigus. A contagious typhus. On the first, second, or third day of the disease, blisters break out in several parts of the body, of the bigness of a bean, remaining for many days, and at last pouring out a thin ichor.

Genus XXXV. Aphtha. Synochus; the tongue somewhat swelled and of a livid colour, as well as the fauces; eschars first appearing in the fauces, but at length occupying the whole internal part of the mouth, of a white colour, sometimes distinct, often running together; quickly growing again when taken off; and remaining for an uncertain time.

The species are, 1. Idiopathic. 2. Symptomatic.

ORDER IV. Hæmorrhagiæ. Pyrexia, with a profusion of blood, without any external violence: the blood drawn from a vein hath the same appearance as in phlegmasiæ.

Genus XXXVI. Epistaxis. Pain or weight of the head, redness of the face; a profusion of blood from the nose.

I. Idiopathic.

Varying according to the time of life.

1. Epistaxis of young people, with symptoms of an arterious plethora.

2. Epistaxis of old people, with symptoms of a venous plethora.

II. Symptomatic.

1. From internal causes.

2. From external causes.

Genus XXXVII. Hæmoptysis. Redness of the cheeks; a sensation of uneasiness, or pain, and sometimes of heat in the breast; difficulty of breathing; tickling of the fauces; either a severe or less violent cough, bringing up florid and frequently frothy blood.

The idiopathic species are,

1. Hæmoptysis (plethorica), without any external violence, and without being preceded by any cough or suppression of any customary evacuation.

2. Hæmoptysis (violenta), from external violence applied.

3. Hæmoptysis (phthisica), after a long continued cough, with a leanness and debility.

4. Hæmoptysis (calculosa), in which some calculous molecules, for the most part of a calcareous nature, are thrown up.

5. Hæmoptysis (vicaria), after the suppression of a customary evacuation.

Besides these, there are a number of symptomatic species mentioned by different authors. The consequence of an hæmoptysis is, a

Phthisis. A wasting and debility of the body, with a cough, hectic fever, and for the most part a purulent expectoration. The species are,

I. An incipient phthisis, without any expectoration of pus.

II. A confirmed phthisis, with an expectoration of pus.

Both species vary, 1. As to their remote cause. 2. As to the origin of the purulent matter.

Genus XXXVIII. Hæmorrhois. Weight and pain of the head; vertigo; pain of the loins; pain of the anus; livid painful tubercles, from which for the most part blood flows out; which sometimes also drops out of the anus, without any apparent tumour. The species are,

1. Hæmorrhois (tumens), external from mariscæ. Varying.

A. Bloody.

B. Mucous.

2. Hæmorrhois (procidens), external from a *procidentia ani.*

3. Hæmorrhois (fluens), internal, without any swelling, or *procidentia ani.*

4. Hæmorrhois (cæca), with pain and swelling of the anus, without any profusion of blood

Genus XXXIX. Menorrhagia. Pains of the back, belly, and loins, like those of child-birth; an unusually copious flux of the menses or blood from the vagina. The species are,

1. Menorrhagia (rubra), bloody in women neither with child nor in child-birth.

2. Menorrhagia (abortus), bloody in women with child.

3. Menorrhagia (lochialis), bloody in women after delivery.

4. Menorrhagia (vitiorum), bloody from some local disease.

5. Menorrhagia (alba), serous, without any local disease, in women not with child.

6. Menorrhagia (Nabothi), serous in women with child.

Order V. Profluvia. Pyrexia, with an increased secretion, naturally not bloody,

Genus XL. Catarrhus. Pyrexia frequently contagious; an increased excretion of mucus, at least efforts to excrete it.

The species are for the most part symptomatic.

1. From cold.

2. From contagion.

Genus XLI. Dysenteria. Contagious pyrexia; frequent mucous or bloody stools, while the alvine fæces are for the most part retained; gripes; tenesmus.

Varying.

1. Accompanied with worms.

2. With the excretion of small fleshy or sebaceous bodies.

3. With an intermittent fever.

4. Without blood.

5. With miliary fever.

Class II. Neuroses. An injury of the sense and motion, without an idiopathic pyrexia or any local affection.

Order I. Comata. A diminution of voluntary motion, with sleep, or a deprivation of the senses.

Genus XLII. Apoplexia. Almost all voluntary motion diminished, with sleep more or less profound; the motion of the heart and arteries remaining.

The idiophatic species are,

1. Apoplexia (sanguinea), with symptoms of universal plethora, especially of the head.

2. Apoplexia (serosa), with a leucophlegmatia over the whole body, especially in old people.

3. Apoplexia (hydrocephalica), coming on by degrees; affecting infants, or those below the age of puberty, first with lassitude, a slight fever and pain of, the head, then with slowness of the pulse, dilatation of the pupil of the eye, and drowsiness.

4. Apoplexia (atrabiliaria), taking place in those of a melancholic constitution.

5. Apoplexia (traumatica), from some external injury mechanically applied to the head.

6. Apoplexia (venenata), from powerful sedatives taken internally or applied externally.

7. Apoplexia (mentalis), from a passion of the mind.

8. Apoplexia (cataleptica), the muscles remaining contractile, by external motion of the limbs.

9. Apoplexia (suffocata), from some external suffocating power.

The apoplexia is frequently symptomatic.

1. Of an intermitting fever. 2. Continued fever. 3. Phlegmasia. 4. Exanthema. 5. Hysteria. 6. Epilepsy. 7. Podagra. 8. Worms. 9. Ischuria. 10. Scurvy.

Genus XLIII. Paralysis. Only some of the voluntary motions diminished, frequently with sleep.

The idiopathic species are,

1. Paralysis (partialis), of some particular muscles only.

2. Paralysis (hemiplegica), of one side of the body.

Varying according to the constitution of the body.

a, Hemiplegia in a plethoric habit.

b, In a leucophlegmatic habit.

3. Paralysis (paraplegica), of one half of the body taken tranversely.

4. Paralysis (venenata), from sedative powers applied either internally or externally.

A symptom either of an asthenia or palsy is,

Tremor; an alternate motion of a limb by frequent strokes and intervals.

The species are, 1. Asthenic. 2. Paralytic. 3. Convulsive.

Order II. Adynamiæ. A diminution of the involuntary motions, whether vital or natural.

Genus XLIV. Syncope; a diminution, or even a total stoppage, of the mouth of the heart for a little.

I. Idiopathic.

1. Syncope (cardiaca), returning frequently without any manifest cause, with violent palpitations of the heart during the intervals.—From a fault of the heart or neighbouring vessels.

2. Syncope (occasionalis), arising from some evident cause.—From an affection of the whole system.

II. Symptomatic; or symptoms of diseases either of the whole system, or of other parts besides the heart.

Genus XLV. Dyspepsia. Anorexia, nausea, vomiting, inflation, belching, rumination, cardialgia, gastrodynia, more or fewer of those symptoms at least concurring; for the most part with a constipation of the belly, and without any other disease either of the stomach itself or of other parts.

I. Idiopathic.

II. Symptomatic.

1. From a disease of the stomach itself.

2. From a disease of other parts, or of the whole body.

Genus XLVI. Hypochondriasis. Dyspepsia, with languor, sadness and fear without any adequate causes, in a melancholy temperament,

Genus XLVII. Chlorosis. Dyspepsia, or a de-

sire of something not used as food; a pale or discoloured complexion; the veins not well filled; a soft tumor of the whole body; asthenia; palpitation; suppression of the menses.

Order III. Spasmi. Irregular motions of the muscles or muscular fibres.

Sect. I. *In the animal functions.*

Genus XLVIII. Tetanus;—a spastic rigidity of almost the whole body.

Varying according to the remote cause, as it arises either from something internal, from cold, or from a wound. It varies likewise, from whatever cause it may arise, according to the part of the body affected.

Genus XLIX. Trismus. A spastic rigidity of the lower jaw.—The species are,

1. Trismus (nescentium), seizing infants under two months old.

2. Trismus (traumaticus), seizing people of all ages either from a wound or cold.

Genus L. Convulsio.—An irregular clonic contraction of the muscles without sleep.

I. Idiopathic.

II. Symptomatic.

Genus LI. Chorea, attacking those who have not yet arrived at puberty, most commonly within the 10th or 14th year, with convulsive motions for the most part of one side in attempting the voluntary motion of the hands and arms, resembling the gesticulations of mountebanks; in walking, rather dragging one of their feet after them than lifting it.

Genus LII. Raphania. A spastic contraction of the joints, with a convulsive agitation, and most violent periodical pain.

Genus LIII. Epilepsia. A convulsion of the muscles, with sleep.

The idiopathic species are,

1. Epilepsia (cerebralis), suddenly attacking without any manifest cause, without any sense of uneasiness preceding, excepting perhaps a slight vertigo or scotomia.

2. Epilepsia (sympathica), without any manifest cause, but preceded by the sensation of a kind of air rising from a certain part of the body towards the head.

3. Epilepsia (occasionalis), arising from a manifest irritation, and ceasing on the removal of that irritation.

Varying according to the difference of the irritating matter. And thus it may arise,

From injuries of the head; pain; worms; poison; from the repulsion of the itch; or an effusion of any other acrid humour; from crudities in the stomach; from passions of the mind; from an immoderate hemorrhagy; or from debility.

Sect. II. *In the vital functions.*

In the action of the heart.

Genus LIV. Palpitatio. A violent and irregular motion of the heart.

In the action of the lungs.

Genus LV. Asthma. A difficulty of breathing returning by intervals, with a sense of straitness in the breast, and a noisy respiration with hissing. In the beginning of the paroxysm there is either no cough at all, or coughing is difficult; but towards the end the cough becomes free, frequently with a copious spitting of mucus.—The idiopathic species are,

1. Asthma (spontaneum), without any manifest cause or other concomitant disease.

2. Asthma (exanthematicum), from the repulsion of the itch or other acrid effusion.

3. Asthma (plethoricum), from the suppression of some customary sanguineous evacuation, or from a spontaneous plethora.

Genus LVI. Dyspnœa. A continual difficulty of breathing, without any sense of straitness, but rather of fulness and infarction in the breast; a frequent cough throughout the whole course of the disease.

The idiopathic species are,

1 Dyspnœa (catarrhalis), with a frequent cough, bringing up plenty of viscid mucus.

2. Dyspnœa (sicca), with a cough for the most part dry.

3. Dyspnœa (aërea), increased by the least change of weather.

4. Dyspnœa (terrea), bringing up with the cough an earthy calculous matter.

5. Dyspnœa (aquosa), with scanty urine and œdematous feet; without any fluctuation in the breast, or other signs of an hydrothorax.

6. Dyspnœa (pinguedinosa), in very fat people.

7. Dyspnœa (thoracica), from an injury done to the parts surrounding the thorax, or from some bad conformation of them.

8. Dyspnœa (extrinsica), from evident external causes.

The symptomatic species of dyspnœa are symptoms,

1. Of diseases of the heart or large vessels.

2. Of a swelling in the abdomen.

3. Of various diseases.

Genus LVII. Pertussis. A contagious disease; convulsive strangulating cough reiterated with noisy inspiration; frequent vomiting.

Sect. III. *In the natural functions.*

Genus LVIII. Pyrosis. A burning pain in the epigastrium, with plenty of aqueous humour, for the most part insipid, but sometimes acrid, belched up.

Genus LIX. Colica. Pain of the belly, especially twisting round the navel; vomiting; a constipation.

The idiopathic species are,

1. Colica (spasmodica), with retraction of the navel, and spasms of the abdominal muscles.

Varying, by reason of some symptoms superadded. Hence,

a, Colica, with vomiting of excrements, or of matters injected by the anus.

b, Colica, with inflammation supervening.

2. Colica (pictonum), preceded by a sense of weight or uneasiness in the belly, especially about the navel; then comes on the colic pain, at first slight and interrupted, chiefly augmented after meals: at length more severe and almost continual, with pains of the arms and back, at last ending in a palsy.

Varying according to the nature of the remote cause; and hence,

a, From metallic poison.

b, From acids taken inwardly.

c, From cold.

d, From a contusion of the back.

3. Colica (stercorea), in people subject to costiveness.

4. Colica (accidentalis), from acrid matter taken inwardly.

5. Colica (meconialis), in new-born children, from a retention of the meconium.

6. Colic (callosa), with a sensation of stricture in some part of the intestines, and frequently of a collection of flatus with some pain before the constricted part; which flatus also passing through the part where the stricture is felt, gradually vanishes;

the belly slow, and at last passing only a few liquid fæces

7. Colica (calculosa), with a fixed hardness in some part of the abdomen, and calculi sometimes passing by the anus.

Genus LX. Cholera. A vomiting of bilious matter, and likewise a frequent excretion of the same by stool; anxiety; gripes; spasms in the calves of the legs.

I. Idiopathic.

1. Cholera (spontanea), arising in a warm season, without any manifest cause.

2. Cholera (accidentalis), from acrid matters taken inwardly.

II. Symptomatic.

Genus LXI. Diarrhœa. Frequent stools; the disease not infectious; no primary pyrexia.

I. Idiopathic.

1. Diarrhœa (crapulosa), in which the excrements are voided in greater quantity than naturally.

2. Diarrhœa (biliosa), in which yellow fæces are voided in great quantity.

3. Diarrhœa (mucosa), in which either from acrid substances taken inwardly, or from cold, especially applied to the feet, a great quantity of mucus is voided.

4. Diarrhœa (cœliaca), in which a milky humour of the nature of chyle is passed.

5. Diarrhœa (lienteria), in which the aliments are discharged with little alteration soon after eating.

6. Diarrhœa (hepatirrhœa), in which a bloody serous matter is discharged without pain.

II. Symptomatic.

Genus LXII. Diabetes. A chronical profusion of urine, for the most part preternatural, and in immoderate quantity.

I. Idiopathic.

1. Diabetes (mellitus,) with urine of the smell, colour, and taste of honey.

2. Diabetes (insipidus), with limpid, but not sweet urine.

II. Symptomatic.

Genus LXIII. Hysteria. Rumbling of the bowels; a sensation as of a globe turning itself in the belly, ascending to the stomach and fauces, and there threatening suffocation; sleep; convulsions; a great quantity of limpid urine; the mind involuntarily fickle and mutable.

The following are by Sauvages reckoned distinct idiopathic species; but, by Dr. Cullen, only varieties of the same species.

A, From a retention of the menses.

B, From a menorrhagia cruenta.

C, From a menorrhagia serosa, or fluor albus.

D, From an obstruction of the viscera.

E, From a fault of the stomach.

F, From too great salacity.

Genus LXIV. Hydrophobia. A dislike and horror at any kind of drink, as occasioning a convulsion of the pharynx; induced, for the most part, by the bite of a mad animal. The species are,

I. Hydrophobia (rabiosa), with a desire of biting the by-standers, occasioned by the bite of a mad animal.

II. Hydrophobia (simplex), without madness, or any desire of biting.

ORDER IV. Vesaniæ. Disorders of the judgment, without any pyrexia or coma.

Genus LXV. Amentia; an imbecility of judgment, by which people either do not perceive, or do not remember, the relations of things. The species are,

I. Amentia (congenita), continuing from a person's birth.

II. Amentia (senilis), from the diminution of the perceptions and memory through extreme old age.

III. Amentia (acquisita), occurring in people formerly of a sound mind, from evident external causes.

Genus LXVI. Melancholia; a partial madness, without dyspepsia.

Varying according to the different subjects concerning which the person raves; and thus it is,

1. With an imagination in the patient concerning his body being in a dangerous condition, from slight causes; or that his affairs are in a desperate state.

2. With an imagination concerning a prosperous state of affairs.

3 With violent love, without satyriasis or nymphomania.

4. With a superstitious fear of a future state.

5 With an aversion from motion and all the offices of life.

6. With restlessness, and an impatience of any situation whatever.

7. With a weariness of life.

8. With a deception concerning the nature of the patient's species.

Dr. Cullen thinks that there is no such disease as that called dæmonomania, and that the diseases mentioned by Sauvages under that title are either,

1. Species of melancholy or mania; or

2. Of some disease by the spectators falsely ascribed to the influence of an evil spirit; or

3. Of a disease entirely feigned; or,

4. Of a disease partly true and partly feigned.

Genus LXVII. Mania; universal madness.

1. Mania (mentalis), arising entirely from passions of the mind.

2. Mania (corporea), from an evident disease of the body.

Varying according to the different disease of the body.

3. Mania (obscura), without any passion of mind or evident disease of the body preceding.

The symptomatic species of mania are,

1. Paraphrosyne from poisons.

2. Paraphrosyne from passion.

3 Paraphrosyne febrilis.

Genus LXVIII. Oneirodynia. A violent and troublesome imagination in time of sleep.

1. Oneirodynia (activa), exciting to walking and various motions.

2. Oneirodynia (gravans), from a sense of some weight incumbent, and pressing on the breast especially.

CLASS III. Cachexiæ; a depraved habit of the whole or greatest part of the body, without primary pyrexia or neurosis.

ORDER I. Marcores. A wasting of the whole body.

Genus LXIX. Tabes. Leanness, asthenia, hectic pyrexia. The species are,

1. Tabes (purulenta), from an external or internal ulcer, or from a vomica.

Varying in its situation: hence,

2. Tabes (scrophulosa), in scrophulous constitutions.

3. Tabes (venenata), from poison taken inwardly.

Genus LXX. Atrophia. Leanness and asthenia, without hectic pyrexia. The species are,

1. Atrophia (inanitorum), from too great evacuation.

2. Atrophia (famelicorum), from a deficiency of nourishment.

3. Atrophia (cacochymica), from corrupted nourishment.

4. Atrophia (debilium), from the function of nutrition being depraved, without any extraordinary evacuation or cacochymia having preceded.

ORDER II. Intumescentiæ. An external tumor of the whole or greatest part of the body.

Sect. I. *Adiposæ.*

Genus LXXI Polysarcia; a troublesome swelling of the body from fat.

Sect. II. *Flatuosæ.*

Genus LXII. Pneumatosis. A tense elastic swelling of the body, crackling under the hand. The species are,

1. Pneumatosis (spontanea), without any manifest cause.

2. Pneumatosis (traumatica), from a wound in the breast.

3. Pneumatosis (venenata), from poison injected or applied.

4. Pneumatosis (hysterica), with hysteria.

Genus LXXIII. Tympanites. A tense, elastic, sonorous swelling of the abdomen; costiveness; a decay of the other parts. The species are,

1. Tympanites (intestinalis), with a tumor of the abdomen frequently unequal, and with a frequent evacuation of air relieving the tension and pain.

2. Tympanites (abdominalis), with a more evident noise, a more equable tumor, and a less frequent emission of flatus, which also gives less relief.

Genus LXXIV. Physometra. A slight elastic swelling in the epigastrium, having the figure and situation of the uterus.

Sect. III. *Aquosæ* or *Hydropes.*

Genus LXXV. Anasarca. A soft, inelastic swelling of the whole body, or some part of it. The species are,

1. Anasarca (serosa), from a retention of serum on account of the suppression of the usual evacuations, or from an increase of the serum on account of too great a quantity of water taken inwardly.

2. Anasarca (oppilata), from a compression of the veins.

3. Anasarca (exanthematica), arising after exanthemata, especially after the erysipelas.

4. Anasarca (anæmia), from the thinness of the blood produced by hæmorrhagy.

5. Anasarca (debilium), in weak people after long diseases, or from other causes.

Genus LXXVI. Hydrocephalus. A soft inelastic swelling of the head, with the sutures of the cranium opened.

Genus LXXVII. Hydrorachitis. A soft, slender tumor above the vertebræ of the loins; the vertebræ gaping from each other.

Genus LXXVIII. Hydrothorax. Dyspnœa; paleness of the face; œdematous swellings of the feet; scanty urine; lying down difficult; a sudden and spontaneous waking out of sleep, with palpitation; water fluctuating in the breast.

Genus LXXIX. Ascites. A tense, scarce elastic, but fluctuating swelling of the abdomen. The species are,

1. Ascites (abdominalis), with an equal swelling of the whole abdomen, and with a fluctuation sufficiently evident.

Varying according to the cause.

A, From an obstruction of the viscera.

B, From debility.

C, From a thinness of the blood.

2. Ascites (saccatus), with a swelling of the abdomen, in the beginning at least, partial, and with a less evident fluctuation.

Genus LXXX. Hydrometra. A swelling of the hypogastrium in women, gradually increasing, keeping the shape of the uterus, yielding to pressure, and fluctuating; without ischuria or pregnancy.

Genus LXXXI. Hydrocele. A swelling of the scrotum, not painful; increasing by degrees, soft, fluctuating, and pellucid.

Sect. IV. *Solidæ.*

Genus LXXXII. Physconia. A swelling chiefly occupying a certain part of the abdomen, gradually increasing, and neither sonorous nor fluctuating. The species are,

Physconia hepatica.

Physconia splenica.

Physconia renalis.

Physconia uterina.

Physconia ab ovario.

Physconia mesenterica.

Physconia intestinalis.

Physconia omentalis.

Physconia polysplachna.

Physconia visceralis.

Physconia externa lupialis.

Physconia externa scirrhodea.

Physconia externa hydatidosa.

Physconia ab adipe subcutaneo.

Physconia ab excrescentia.

Genus LXXXIII. Rachitis. A large head, swelling most in the forepart, the ribs depressed; abdomen swelled, with a decay of the other parts.

Varying,

1. Simple, without any other disease.

2. Joined with other diseases.

ORDER III. Impetigines. Cachexies chiefly deforming the skin and external parts of the body.

Genus LXXXIV. Scrophula. Swellings of the conglobate glands, especially in the neck; swelling of the upper lip and support of the nose; the face florid, skin thin, abdomen swelled. The species are,

1. Scrophula (vulgaris), simple, external, and permanent.

2. Scrophula (mesenterica), simple, internal, with paleness of the face, want of appetite, swelling of the abdomen, and unusual fetor of the excrements.

3 Scrophula (fugax), most simple, appearing only about the neck; for the most part proceeding from the resorption of the matter of ulcers in the head.

4. Scrophula (Americana), joined with the yaws.

Genus LXXXV. Syphilis. A contagious disease, after impure venery, and a disorder of the genitals; ulcers of the tonsils; of the skin, especially about the margin of the hair; corymbose papulæ, ending in crusts and crusty ulcers; pains of the bones; exostoses.

Genus LXXXVI. Scorbutus. In cold countries, attacking after putrescent diet, especially such as is salt and of the animal kind, where no supply of fresh vegetables is to be had; asthenia; stomacace; spots of different colours on the skin, for the most part livid, and appearing chiefly among the roots of the hair.

Varying in degree,

a, Scorbutus insipiens.
b, Scorbutus crescens.
c, Scorbutus inveteratus.
Varying also in symptoms.
d, Scorbutus lividus.
e, Scorbutus petechialis.
f, Scorbutus pallidus.
g, Scorbutus ruber.
h, Scorbutus calidus.

Genus LXXXVII. Elephantiasis. A contagious disease; thick, wrinkled, rough, unctuous skin, destitute of hairs, anæsthesia in the extremities, the face deformed with pimples, the voice hoarse and nasal.

Genus LXXXVIII. Lepra. The skin rough, with white, branny, and chopped eschars, sometimes moist beneath, with itching.

Genus LXXXIX. Framboesia. Swellings resembling fungi, or the fruit of the mulberry or raspberry, growing on various parts of the skin.

Genus XC. Trichoma. A contagious disease; the hairs thicker than usual, and twisted into inextricable knots and cords.

Genus XCI. Icterus. Yellowness of the skin and eyes; white fæces; urine of a dark red, tinging what is put into it of a clay-colour.

The idiopathic species are,

1. Icterus (calculosus), with acute pain in the epigastric region, increasing after meals; biliary concretions voided by stool.

2. Icterus (spasmodicus), without pain, after spasmodic diseases and passions of the mind.

3. Icterus (hepaticus), without pain, after diseases of the liver.

4. Icterus (gravidarum), arising during the time of pregnancy, and going off after delivery.

5. Icterus (infantum), coming on in infants a few days after birth.

Class IV. Locales. An affection of some part, but not of the whole body.

Order I. Dysethesiæ. The senses depraved, or destroyed, from a disease of the external organs.

Genus XCII. Caligo. The sight impaired or totally destroyed, on account of some opaque substance interposed between the objects and the retina, inherent in the eye itself or the eye-lids. The species are,

1. Caligo (lentis), occasioned by an opaque spot behind the pupil.

2. Caligo (corneæ), from an opacity of the cornea.

3. Caligo (pupillæ), from an obstruction of the pupil.

Varying according to the different causes from which it proceeds.

4. Caligo (humorum), from a disease or defect of the aqueous humour.

Varying according to the different state of the humour.

5. Caligo (palpebrarum), from a disease inherent in the eye-lids.

Varying according to the nature of the disease in the eye-lids.

Genus XCIII. Amaurosis. The sight diminished, or totally abolished, without any evident disease of the eye; the pupil for the most part remaining dilated and immoveable. The species are,

1. Amaurosis (compressionis), after the causes and attended with the symptoms of congestion in the brain.

Varying according to the nature of the remote cause.

2. Amaurosis (atonica), after the causes and accompanied with symptoms of debility.

3. Amaurosis (spasmodica), after the causes and with the signs of spasm.

4. Amaurosis (venenata), from poison taken into the body or applied outwardly to it.

Genus XCIV. Dysopia. A depravation of the sight, so that objects cannot be distinctly perceived, except at a certain distance, and in a certain situation. The species are,

1. Dysopia (tenebrarum), in which objects are not seen unless they be placed in a strong light.

2. Dysopia (luminis), in which objects are not distinctly seen unless by a weak light.

3. Dysopia (dissitorum), in which distant objects are not perceived.

4. Dysopia (proximorum), in which the nearest objects are not perceived.

5. Dysopia (lateralis), in which objects are not perceived unless placed in an oblique posture.

Genus XCV. Pseudoblepsis. When the sight is diseased in such a manner that the person imagines he sees things which really do not exist, or sees things which do exist after some other manner than they really are. The species are,

1. Pseudoblepsis (imaginaria), in which the person imagines he sees things which really do not exist.

Varying according to the nature of the imagination.

2. Pseudoblepsis (mutans), in which objects really existing appear somehow changed.

Varying according to the change perceived in the objects, and according to the remote cause.

Genus XCVI. Dysecœa. A diminution or total abolition of the sense of hearing. The species are,

1. Dysecœa (organica), from a disease in the organs transmitting sounds to the internal ear.

Varying according to the nature of the disease and of the part affected.

2. Dysecœa (atonica), without any evident disease of the organs transmitting the sounds.

Varying according to the nature of the cause.

Genus XCVII. Paracusis. A depravation of the hearing. The species are,

1. Paracusis (imperfecta), in which though sounds coming from external objects are heard, yet it is neither distinctly nor in the usual manner.

Varying,

a, With a dulness of hearing.
b, With a hearing too acute and sensible.
c, When a single external sound is doubled by some internal causes.
d, When the sounds which a person desires to hear are not perceived, unless some other violent sound is raised at the same time.

2. Paracusis (imaginaria), in which sounds not existing externally are excited from internal causes.

Varying according to the nature of the sound perceived, and according to the nature of the remote cause.

Genus XCVIII. Anosmia. A diminution or abolition of the sense of smell. The species are,

1. Anosmia (organica), from a disease in the membrane lining the internal parts of the nostrils.

Varying according to the nature of the disease.

2. Anosmia (atonica), without any evident disease of the membrane of the nose.

Genus XCIX. Agheustia. A diminution or abolition of the sense of taste.

1. Agheustia (organica), from a disease in the membrane of the tongue, keeping off from the nerves those substances which ought to produce taste.

2. Agheustia (atonica), without any evident disease of the tongue.

Genus C. Anæsthesia. A diminution or abolition of the sense of feeling. The species from Sauvages, adopted by Dr. Cullen, are,

1. Anæsthesia a spina bifida.
2. Anæsthesia plethorica.
3. Anæsthesia nascentium.
4. Anæsthesia melancholica.

Order II. Dysorexia. Error or defect in appetite.

Sect. I. *Appetitus erronei.*

Genus CI. Bulimia. A desire for food in greater quantities than can be digested.

The idiopathic species are,

1. Bulimia (helluonum), an unusual appetite for food, without any disease of the stomach.

2. Bulimia (syncopalis), a frequent desire of meat, on account of a sensation of hunger threatening syncope.

3. Bulimia (emetica), an appetite for a great quantity of meat, which is thrown up immediately after it is taken.

Genus CII. Polydipsia. An appetite for an unusual quantity of drink.

The polidypsia is almost always symptomatic, and varies only according to the nature of the disease which accompanies it.

Genus CIII. Pica. A desire of swallowing substances not used as food.

Genus CIV. Satyriasis. An unbounded desire of venery in men. The species are,

1. Satyriasis (juvenilis), an unbounded desire of venery, the body at the same time being little disordered.

2. Satyriasis (furiens), a vehement desire of venery, with a great disorder of the body at the same time.

Genus CV. Nymphomania. An unbounded desire of venery in women.

Varying in degree.

Genus CVI. Nostalgia. A violent desire in those who are absent from their country of revisiting it.

1. Nostalgia (simplex), without any other disease.

2. Nostalgia (complicata), accompanied with other diseases.

Sect. II. *Appetitus deficientes.*

Genus CVII. Anorexia. Want of appetite for food. Always symptomatic.

1. Anorexia (humoralis), from some humour loading the stomach.

2. Anorexia (atonica), from the tone of the fibres of the stomach being lost.

Genus CVIII. Adipsia. A want of thirst. Always a symptom of some disease affecting the sensorium commune.

Genus CIX. Anaphrodisia. Want of desire for, or impotence to, venery.

The true species are,

1. Anaphrodisia paralytica.
2. Anaphrodisia gonorrhoica.

The false ones are,

1. Anaphrodisia a mariscis.
2. Anaphrodisia ab urethræ vitio.

Order III. Dyscinesiæ. An impediment, or depravation of motion from a disorder of the organs.

Genus CX. Aphonia. A total suppression of voice without coma or syncope. The species are,

1. Aphonia (gutturalis), from the fauces or glottis being swelled.

2. Aphonia (trachealis), from a compression of the trachea.

3. Aphonia (atonica), from the nerves of the larynx being cut.

Genus CXI. Mutitas. A want of power to pronounce words. The species are,

1. Mutitas (organica), from the tongue being cut out or destroyed.

2. Mutitas (atonica), from the injuries done to the nerves of the tongue.

3. Mutitas (surdorum), from people being born deaf, or the hearing being destroyed during childhood.

Genus CXII. Paraphonia. A depraved sound of the voice. The species are,

1. Paraphonia (puberum), in which, about the time of puberty, the voice, from being acute and sweet, becomes more grave and harsh.

2. Paraphonia (rauca), in which, by reason of the dryness or flaccid tumor of the fauces, the voice becomes rough and hoarse.

3. Paraphonia (resonans), in which, by reason of an obstruction in the nostrils, the voice becomes hoarse, with a sound hissing through the nostrils.

4. Paraphonia (palatina), in which, on account of a defect or division of the uvula, for the most part with an hare lip, the voice becomes obscure, hoarse, and unpleasant.

5. Paraphonia (clangens), in which the voice is changed to one acute, shrill, and small.

6. Paraphonia (comatosa), in which, from a relaxation of the velum palati and glottis, a sound is produced during inspiration.

Genus CXIII. Psellismus. A defect in the articulation of words. The species are,

1. Psellismus (hæsitans), in which the words, especially the first ones of a discourse, are not easily pronounced, and not without a frequent repetition of the first syllable.

2. Psellismus (ringens), in which the sound of the letter R is always aspirated, and, as it were, doubled.

3. Psellismus (lallans), in which the sound of the letter L becomes more liquid, or is pronounced instead of R.

4. Psellismus (emolliens), in which the hard letters are changed into the softer ones, and thus the letter S is much used.

5. Psellismus (balbutiens), in which by reason of the tongue being large, or swelled, the labial letters are better heard, and often pronounced instead of others.

6. Psellismus (acheilos), in which the labial letters cannot be pronounced at all, or with difficulty.

7. Psellismus (logostomatum), in which, on account of the division of the palate, the guttural letters are less perfectly pronounced.

Genus CXIV. Strabismus. The optic axes of the eyes not converging. The species are,

1. Strabismus (habitualis), from a bad custom of using only one eye.

2. Strabismus (commodus), from the greater debility or mobility of one eye above the other; so that both eyes cannot be conveniently used.

3. Strabismus (necessarius), from a change in the situation or shape of the parts of the eye.

Genus CXV. Contractura. A long continued and rigid contraction of one or more limbs. The species are,

1. Contractura (primaria), from the muscles becoming contracted and rigid.

a, From the muscles becoming rigid by inflammation.

b, From muscles becoming rigid by spasm.

c, From muscles contracted by reason of their antagonists having become paralytic.

d, From muscles contracted by an irritating acrimony.

2. Contractura (articularis), from stiff joints.

Order IV. Apocenoses. A flux either of blood or some other humour flowing more plentifully than usual, without pyrexia, or an increased impusle of fluids.

Genus CXVI. Profusio. A flux of blood.

Genus CXVII. Ephidrosis. A preternatural evacuation of sweat.

Symptomatic ephidroses vary according to the nature of the diseases which they accompany, the different nature of the sweat itself, and sometimes the different parts of the body which sweat most.

Genus CXVIII. Epiphora. A flux of the lachrymal humour.

Genus CXIX. Ptyalismus. A flux of saliva.

Genus CXX. Enuresis. An involuntary flux of urine without pain. The species are,

1. Enuresis (atonica), after diseases injuring the sphincter of the bladder.

2. Enuresis (irritata), from a compression or irritation of the bladder.

Genus CXXI. Genorrhœa. A preternatural flux of humour from the uthera in men, with or without a desire of venery. The species are,

1. Genorrhœa (pura), in which, without any impure venery having preceded, a humour resembling pus, without dysuria or propensity to venery, flows from the urethra.

2. Genorrhœa (impura), in which, after impure venery, an humour like pus flows from the urethera with dysuria. The consequence of this is,

3. Genorrhœa (mucosa), in which, after an impure gonorrhœa, a mucous humour flows from the urethra with little or no dysuria.

4. Genorrhœa (laxorum), in which an humour for the most part pellucid, without any erection of the penis, but with a propensity to venery, flows from the urethra while the person is awake.

5. Genorrhœa (dormientium), in which the seminal liquor is thrown out, with erection and desire of venery, in those who are asleep and have lascivious dreams.

Order V. Epischeses. Suppressions of evacuation.

Genus CXXII. Obstipatio. The stools either suppressed, or slower than usual. The species are,

1. Opstipatio (debilium), in lax, weak, and for the most part dyspeptic persons.

2. Obstipatio (rigidorum), in people whose fibres are rigid, and frequently of an hypochondriac disposition.

3. Obstipatio (obstructorum), with symptoms of the colica 1st, 2d, 4th, and 7th, above-mentioned.

Genus CXXIII. Ischuria. An absolute suppression of urine. The species are,

1. Ischuria (renalis), coming after a disease of the kidneys, with pain, or troublesome sense of weight in the region of the kidneys, and without any swelling of the hypogastrium, or desire of making water.

2. Ischuria (ureterica), coming after a disease of the kidneys, with a sense of pain or uneasiness in some part of the ureter, and without any tumor of the hypogastrium, or desire of making water.

3. Ischuria (vesicalis), with a swelling of the hypogastrium, pain at the neck of the bladder, and a frequent stimulus to make water.

4. Ischuria (urethralis), with a swelling of the hypogastrium, frequent stimulus to make water, and pain in some part of the urethra.

All these species are subdivided into many varieties, according to their different causes.

Genus CXXIV. Dysuria. A painful, and somehow impeded emission of urine. The species are,

1. Dysuria (ardens), with heat of water, without any manifest disorder of the bladder.

2. Dysuria (spasmodica), from a spasm communicated from the other parts to the bladder.

3. Dysuria (compressionis), from the neighbouring parts pressing upon the bladder.

4. Dysuria (phlogistica), from an inflammation of the neighbouring parts.

5. Dysuria (irritata), with signs of a stone in the bladder.

6. Dysuria (mucosa), with a copious excretion of mucus.

Genus CXXV. Dyspermatismus. A slow, impeded, and insufficient mission of semen in the venereal act. The species are,

1. Dyspermatismus (urethralis), from disease of the urethra.

2. Dyspermatismus (nodosus), from knots on the cavernous bodies.

3. Dyspermatismus (præputialis), from too narrow an orifice of the prepuce.

4. Dyspermatismus (mucosus), from mucus infarcting the uretha.

5. Dyspermatismus (hypertonicus), from too strong an erection of the penis.

6. Dyspermatismus (epilepticus), from a spasmodic epilepsy happening during the time of coition.

7. Dyspermatismus (apractodes), from an imbecility of the parts of generation.

8. Dyspermatismus (refluus), in which there is no emission of semen, because it returns from the urethra into the bladder.

Genus CXXVI. Amenorrhœa. The menses either flowing more sparingly than usual, or not at all, at their usual time, without pregnancy. The species are,

1. Amenorrhœa (emansionis), in those arrived at puberty, in whom, after the usual time, the menses have not yet made their appearance, and many different morbid affections have taken place.

2. Amenorrhœa (suppressionis), in adults, in whom the menses which had already begun to flow are suppressed.

3. Amenorrhœa (difficilis), in which the menses flow sparingly, and with difficulty.

Order VI. Tumores. An increased magnitude of any part without phlogosis.

Genus CXXVII. Aneurisma. A soft tumor, with pulsation, above an artery.

Genus CXXVIII. Varix. A soft tumor, without pulsation, above a vein.

Genus CXXIX. Ecchymoma. A diffused, and scarce eminent, livid tumor.

Genus CXXX. Scirrhus. An hard tumor of some part, generally of a gland, without pain, and difficultly brought to suppuration.

Genus CXXXI. Cancer. A painful tumor of a scirrhous nature, and degenerating into an ill-conditioned ulcer.

Genus CXXXII. Bubo. A suppurating tumor of a conglobate gland.

Genus CXXXIII. Sarcoma. A soft swelling, without pain.

Genus CXXXIV. Verruca. A harder scabrous swelling.

Genus CXXXV. Clavus. A hard, lamellated thickness of the skin.

Genus CXXXVI. Lupia. A moveable, soft tumor below the skin, without pain.

Genus CXXXVII. Ganglion. An harder moveable swelling, adhering to a tendon.

Genus CXXXVIII. Hydatis. A cuticular vesicle filled with aqueous humour.

Genus CXXXIX. Hydarthrus. A most painful swelling of the joints, chiefly of the knee, at first scarce elevated, of the same colour with the skin, diminishing the mobility.

Genus CXL. Exostosis. A hard tumor adhering to a bone.

Order VII. Ectopiæ. Tumors occasioned by the removal of some part out of its proper situation.

Genus CXLI. Hernia. An ectopia of a soft part as yet covered with the skin and other integuments.

Genus CXLII. Prolapsus. A bare ectopia of some soft part.

Genus CXLIII. Luxatio. The removal of a bone from its place in the joints.

Order VIII. Dialyses. A solution of continuity; manifest to the sight or touch.

Genus CXLIV. Vulnus. A recent and bloody solution of the unity of some soft part by the motion of some hard body.

Genus CXLV. Ulcus. A purulent or ichorous solution of a soft part.

Genus CXLVI. Herpes. A great number of phlyctenæ or small ulcers, gathering in clusters, creeping, and obstinate.

Genus CXLVII. Tinea. Small ulcers among the roots of the hair of the head, pouring out a humour which changes to a white friable scurf.

Genus CXLVIII. Psora. Itchy pustules and little ulcers of an infectuous nature, chiefly infesting the hands.

Genus CXLIX. Fractura. Bones broken into large fragments.

Genus CL. Caries. An exulceration of a bone.

Part IV.

Practice.

This after all is the most important branch of medical science, and that to which every other branch ought to be merely subservient. The Greeks denominated it πραξις (praxis), the Latins *modus medendi*; we have preferred the English synonym as writing for general readers.

In developing the modern practice of medicine, we shall follow as nearly as our limits will allow all the preceding arrangement of Dr. Cullen; and shall endeavour to draw our instructions from the best established authorities of modern times.

Class I.

Pyrexiæ.—Frequent pulse succeeded by shivering or horror; increased heat; disturbed functions; prostration of strength.

Order I.

Febris. Fever.—Pyrexy independent of local affection as its cause; languor, lassitude, and other signs of debility.

This order is divided into two sections; *intermittent*, including tertians, quartans, and quotidians, with the different varieties of these distinct genera; and *continued*, which include the genera of *synocha*, or simple inflammatory fever; *typhus*, putrid, or jail fever; and *synochus*, a mixed fever, commencing like the first, and terminating like the second. The *intermittent* family are defined as follows. Fevers arising from the miasm of marshy grounds, with an evident remission, the returning fits being almost always ushered in by horror or trembling. One paroxysm only in the day. The *continued family* are defined thus: fevers without intermission, not occasioned by marsh miasm, attended with exacerbations and remissions, though not very perceptible.

The remote causes of fever are not always to be easily or accurately distinguished, and of the proximate causes we may fairly be said to know nothing, since so many different conjectures, often in direct hostility to each other, have been offered by writers of the first reputation, and the system of yesterday has so frequently fallen before that of to-day. Without entering therefore into this controverted subject, we shall proceed to an account of the general symptoms and mode of treatment.

Intermittents.

Symptoms.—A regular paroxysm of this fever is divided into three stages—the cold, hot, and sweating stages.

The first stage commences with yawning and stretching; there is at the same time an uneasy sense of weariness or inaptitude to motion, accompanied with some degree of debility; paleness and shrinking of the features and extremities are also observable; at this period some coldness of the extremities may be felt by another person, although the patient takes little or no notice of it; the skin, however, becomes rough, as is the case in cold weather, and is less sensible than usual; a sensation of coldness is now felt by the patient himself, which is at first referred to the back, and gradually spreads over the whole body, producing an universal shaking: after this has lasted for some time, the patient's sensation of cold still continuing, the warmth of his skin, however, to the feeling of another person, or measured by the thermometer, gradually increases; there is nausea, and frequently vomiting of bilious matter; pains of the back, limbs, loins, and head-ach, or more commonly drowsiness, stupor, or a considerable degree of coma attend this stage; the respiration is frequent and anxious; the pulse is small, frequent, sometimes irregular, and often scarcely perceptible: the urine is almost colourless, and without cloud or sediment.

As the cold and shivering, after alternating for some time with warm flushings, gradually abate; the hot stage is ushered in by a preternatural heat, the pulse becomes full, strong, and hard, the respiration is more free, but still frequent and anxious, the paleness and shrinking of the features, together with the constriction of the skin, now disappear, and are succeeded by a general redness and turgescence; the tongue is white and dry, the thirst is considerable, the skin continues parched, the head-ach, if it was absent in the first stage, now comes on, is accompanied with throbbing of the temporal arteries, and frequently rises to delirium, and the urine is high-coloured; as the hot stage advances, the nausea and vomiting abate, and on the appearance of moisture upon the skin, they generally cease altogether. The hot stage is at length terminated by a profuse sweat, which breaks out, first about the face and breast; it gradually extends over the whole body, and terminates the paroxysm; most of the functions are restored to their natural state, the respiration becomes free, the urine deposits a lateritious sediment, the sweat gradually ceases, and with it the febrile symptoms; the patient is, however, left in a weak and wearied state: between the pa-

roxysms, the patient is more easily fatigued than usual, complains of want of appetite, and the skin is parched, or he is more liable to profuse perspiration than in health. The cold fit of this species is longer than that of the quotidian, but shorter than that of the quartan, and the whole paroxysm is shorter than that of the quotidian, but longer than that of the quartan.

The predisposing causes of intermittents are, whatever tends to debilitate the body, a warm moist, or cold damp atmosphere, particular seasons, as spring and autumn: the occasional or exciting causes are, marsh miasmata, contagion, and perhaps lunar influence.

Prognosis.—Mildness and regularity of the paroxysm, a general cutaneous eruption, or an eruption about the mouth and behind the ears, accompanied with a swelling of the upper lip, when the paroxysm is going off: a free hæmorrhage from the nose during the paroxysm, and the urine depositing a lateritious sediment in the last stage, are favourable symptoms. Coma, delirium, great anxiety, difficult respiration, attended with hickup, swelling of the tonsils, the abdomen tumid, hard, and painful to the touch, accompanied with obstinate costiveness, tension and pain in the epigastric and hypochondric regions during the paroxysm, listlessness, nausea, or debility, attended with vertigo in the intermissions, or a few drops of blood falling from the nose in the paroxysm, are unfavourable symptoms. Intermittents are frequently followed by or attended with obstructions in the different viscera, particularly in the liver and spleen; dropsy, dysentery, jaundice, and various species of inflammation.

Treatment.—In the paroxysms we are to endeavour to shorten the different stages, and obtain a final solution of the disease. In the intermissions we are to prevent the recurrence of the paroxysms, and endeavour to obviate certain circumstances, which may prevent the fulfilling of either of the two first indications.

The first indication will be accomplished by the administration of an emetic at the commencement of the paroxysm, or during the cold stage; for which purpose the tartar emetic is the best: it should be given in divided, but pretty large drops; the patient should at the same time be put to bed, kept in warm blankets, and allowed warm diluent, but not stimulating liquors, except there is a considerable degree of debility; and immediately the hot stage is formed a gentle diaphoresis will be excited, and a final solution of the paroxysm procured, by the exhibition of opiates, assisted by moderate draughts of tepid, or, if the heat be preternaturally great, of cold liquids, and by the neutral salts. In the intermissions, the bark should be administered in doses of a drachm or more, every one, two, or three hours, so that an ounce, or an ounce and a half, may be taken during the intermission; when the apyrexy is long, as in the tertian, its exhibition may be delayed till within six or eight hours of the time when the next paroxysm is expected, which will frequently more effectually prevent its return than when given in small doses during a long intermission; but if there is a great degree of debility, or where the intermissions are short, as in the quotidian, the cinchona should be employed immediately after the termination of the paroxysm, at longer or shorter intervals, until the return of the next fit, in such doses as the stomach will bear, and the urgency of the case may require: when this invaluable medicine purges, a few drops of the tincture of opium may be added; and if, on the other hand, it induces costiveness, a few grains of the rhubarb will obviate it, and at the same time give tone to the stomach and bowels; it is sometimes of service to add about a scruple of snake-root to each dose of the bark; where the stomach is habitually weak, it will be advisable to combine aromatics or bitters with the bark, as calamus, or canella alba, &c. The sulphat of copper may be employed in their usual doses: the oxyd of arsenic combined with opiates, either in solution or in the form of pills, will frequently succeed, when the bark and other remedies have been tried without effect. If the disease should prove obstinate, and any pain can be perceived by the patient upon pressing the right hypochondrium, small doses of the calomel or friction with the unguentum hydrargyri, continued until a slight soreness of the mouth is induced, will, in general, be attended with the most beneficial effects, as its continuance is most commonly the consequence of obstructed viscera. The circumstances which prevent our fulfilling the two first indications are, inflammatory diathesis, accumulation of bile in the stomach, and of that and fæces in the intestinal canal. The first circumstance will be removed by blood-letting; and if, during the paroxysm, any urgent symptoms indicate the presence of that diathesis, it will be attended with the greatest prospect of success, if the operation is performed during the hot stage, when the excitement is most considerable: the latter causes will be removed by the administration of emetics and cathartics: if there is a great degree of debility, the system must be strengthened by a generous diet, the moderate use of wine, gentle exercise, the cold bath, and change of air. As in this disease relapses very frequently occur, it will not only be advisable, but necessary to continue the use of the bark, in doses of a drachm four times a day, for two or three weeks; at the same time the patient must most studiously avoid all the exciting causes, and every irregularity in diet. Vernal are less liable than autumnal intermittents to become continued fevers, and are rarely attended with alarming symptoms, or followed by dangerous obstructions. The taste of the bark will be concealed in a great measure, by exhibiting it in milk, butter-milk, or infusion of liquorice; and if the stomach should possess a considerable degree of irritability opium, administered either by itself or combined with camphor, will, in general, succeed in enabling that organ to retain the bark. The paroxysm may be generally prevented by administering a full dose of the tinctura opii, in mulled wine or hot diluted spirits, about an hour previous to its expected return.

Continued Fever.

This is either inflammatory (*synocha*), putrid or jail (*typhus*), or mixed (*synochus*).

Symptoms of Synocha.—This fever, which, however, without topical inflammation, is in this country a very rare occurrence, generally commences with short fits of cold and heat alternating with each other, to which succeed an intense burning heat, head-ach, accompanied with throbbing of the temples, or *tinnitus aurium*, pains in the back, loins, and joints, and the patient feels as if his body had been severely bruised; the face is full and florid, the eyes are inflamed and incapable of bearing the light, the skin, mouth, and throat are dry, the tongue is covered with a white crust, the thirst is intolerable, the respiration is frequent, hurried, generally oppressed, and attended with a dry cough; there is *anorexia*, *nausea* vomiting,

restlessness, and delirium; the urine is secreted in small quantity, and is high coloured, the bowels are costive, the pulse is frequent, strong, and hard, scarcely ever, however, exceeding one hundred and twenty strokes in a minute; the blood, when drawn, is covered with a whitish or yellowish crust. In this country, after the symptoms have continued for some days, they begin generally to assume those of typhus, so that the whole disease is synochus.

Causes.—Suppression of the accustomed evacuations; cold by any means applied, as exposure of the body to the cold air, when it is in a state of perspiration; exposure to the rays of the sun; intemperance in eating, but more particularly in drinking; topical inflammation; intense study; great fatigue; the premature repulsion of eruptions; perspiration suddenly checked, and violent passions of the mind.

Diagnosis.—This fever will be readily distinguished from the typhus mitior by the strength of the pulse, the intense heat, great thirst, violent pains in the back and joints, high coloured urine, and by the less derangement of the mental functions.

Prognosis.—This fever frequently terminates in a favourable manner about the seventh day, either by hemorrhage, a profuse diaphoresis, or by the urine depositing a copious lateritious sediment; the termination by diarrhœa is a much more rare occurrence. If the respiration is very laborious, if the head-ach is very severe, attended with delirium ferox, if the abdomimal viscera are much affected, if the urine is pale or limpid, and the skin assumes a yellow tinge before the seventh day, we may generally expect an unfavourable issue.

The removal of this disease must be attempted by blood-letting, in proportion to the violence of the symptoms of increased excitement, strength, and former habits of life of the patient, and nature of the prevailing epidemic; if, on the first blood-letting, the symptoms are considerably alleviated, and the pulse and heat become nearly natural, it will not be necessary to repeat it; if, on the contrary, the symptoms continue with but little or no abatement, it will not only be advisable but indispensably necessary to repeat the operation, until we nearly reduce the pulse and heat to the natural standard; the blood-letting will be the more efficacious the more suddenly we abstract the blood: an emetic should then be administered, and in a few hours after its operation has ceased, a cathartic should be exhibited, for which purpose, the phosphat or sulphat of soda, or the sulphat of magnesia combined with the infusion of senna, with a small proportion of the tartarised antimony, will be the most efficacious; the calomel is a preferable medicine to the others; after the contents of the primæ viæ are sufficiently evacuated, we should order the neutral salts, particularly the saline draughts, every two or three hours, to each dose of which, from twenty to thirty drops of antimonial wine, with the same quantity of the spirit of nitre, may be conjoined with advantage; cooling mucilaginous liquors acidulated with the vegetable acids, or cold water, should be freely allowed, when the heat of the surface of the body is steadily above the natural standard. It is of the utmost consequence, throughout the whole course of this disease, that the alimentary canal should be kept clear of feculent matter; for which purpose the mildest laxatives should be employed, or perhaps mucilaginous clysters would be preferable: all exercise, both of the body and mind, must be studiously avoided, the patient must be kept quiet and in a horizontal posture, the light should be as much as possible excluded, there should be a free circulation of cool air through the apartment, the floor of which should be frequently sprinkled with cold water, the patient should be lightly covered with bed-clothes, all excremental matters should be speedily removed, and the patient should have frequent changes of dry linen. If the pain of the head is very violent, accompanied with delirium, or if the patient is oppressed with coma, blood-letting, both general and topical, will be necessary, provided the strength of the patient is not too much exhausted, cathartics and laxative clysters must be ordered, the head should be shaved, and cooling applications, as vinegar and water, or a solution of the volatile salts of hartshorn in vinegar, and the like, must be employed; blistering the head, and fomenting the lower extremities, will also be of service. If the respiration should be much oppressed, and attended with a short dry cough, we must immediately have recourse to blood-letting, both general and local; blisters should be applied to the thorax, and we should direct a liberal use of mucilaginous diluents. Should the abdominal viscera be attacked in the course of the disease, the same general means of blood-letting and blistering must be employed, together with laxatives or fomentation of the lower extremities. In this climate, after a short period, the symptoms generally begin to assume the typhoid form, therefore some degree of caution will be indispensably necessary in the liberal employment of evacuations, lest we should induce a degree of fatal debility.

Symptoms of Typhus.—An uneasy and peculiar sensation in the stomach, sometimes attended with nausea and giddiness, frequently denotes the approach of this fever; in many cases, however, it is scarcely or not at all perceived, and the disease generally commences with lassitude, languor, some degree of debility, horripilatio or sense of creeping, impaired appetite, alternate and irregular heats and chills, anxiety about the præcordia, and great dejection of spirits, accompanied with frequent sighing. After these symptoms have continued for a few days, the patient is attacked with head-ach, or an uneasiness and confusion of head; a deep-seated pain, or a sensation of coldness is perceived, particularly in the occiput; there is nausea, vomiting of insipid phlegm, and great prostration of strength; the heat of the body is but little increased; there is little or no thirst; the tongue at the commencement of the disease is moist and covered with a white crust, in the more advanced stages it becomes dry, brown, and chapped; the countenance is pale and sunk; the pulse is small, weak, and frequent; the respiration is oppressed, and attended with great anxiety about the præcordia; the urine is pale, and secreted in too great a quantity. The uneasiness and confusion of head increase with the debility, and prevent the patient from going to sleep; or, if he does, it does not refresh him; and on the second or third night, some degree of delirium comes on, which, however, goes off in the morning, and returns in a more severe manner every evening; and during the day he lies in a confused state, or is constantly muttering to himself. All these symptoms go on gradually increasing, followed by tremor of the hands and tongue, muscæ volitantes, picking of the bed-clothes, subsultus tendinum, and convulsions, which generally close the scene.

Causes.—The depressing passions of fear, and despair; all excessive evacuations; a

habit of body; immoderate venery; a sedentary and studious life; intemperance in eating and drinking; fatigue; the abstraction of the usual quantity of nourishing food; contagion, and paucity of blood.

Diagnosis.—The slow and insidious appearance of this fever will distinguish it from the typhus gravior: the rigors are less severe; there is a considerably less degree of heat and thirst, and no bilious vomiting; there is also greater mildness in the symptoms, even in the first stage; the skin is pale, and has a bluish and sunk appearance.

Prognosis.—The favourable symptoms are, an universal warm moisture of the skin; the tongue from being dry and foul becoming moist; the pulse being rendered more slow and full after a gentle diaphoresis, or the exhibition of cordials; the appearance of an eruption about the lips and nostrils; a miliary eruption, neither preceded by, nor accompanied with, profuse sweating; deafness; a temporary insanity; an increased secretion of saliva without aphthæ; a spontaneous, but gentle diarrhœa. The unfavourable symptoms are, a great degree of muscular debility; the early appearance and obstinate continuance of delirium; stupidity and listlessness of the eyes on the first days of the disease; a morbid sensibility of the surface, and of all the organs of sense; profuse evacuations, attended with a weak pulse; tremor of the hands and tongue; floccorum collectio; a considerable degree of sighing, mumbling, and moaning; constant watchfulness; coma, accompanied with fulness of the vessels of the tunica adnata, and dilated pupils; a difficulty of swallowing, attended with hickup; an unconscious discharge of the urine and fæces. Dr. Fordyce observes, in his Third Essay on Fevers, page 111, that, if the respiration and deglutition be free, the prognosis is seldom bad, although the disease may be attended with alarming symptoms.

Treatment.—The first step to be taken in this, as well as in most other febrile diseases, is to clear the primæ viæ of their crude and acrid contents, by the early exhibition of an emetic, which, by the concussion it gives to the whole system, dissolves the morbid catenation, and frequently terminates the disease; in a few hours after that has ceased to operate, a cathartic of the calomel should be administered, mixed with a small quantity of conserve, honey, or mucilage, and it should be allowed to remain for a short time about the fauces, before it is swallowed; throughout the whole course of the disease, we must procure the regular expulsion of the fæces, by means of the mildest laxatives, or by the injection of clysters every evening; the skin on every part of the body successively should be washed with cold water, or vinegar and water; wine and opium should be administered in small quantities, and repeated every three hours alternately; the application of small repeated blisters will be of considerable service; the administration of oxygen gass will also prove an useful auxiliary. The symptoms which forbid the use of bark are a hot and dry skin, and a parched tongue; it must therefore be our object of practice to remove those symptoms as early as possible, which will in general be accomplished by the administration of the saline draughts in a state of effervescence, every two, three, or four hours, combined with the infusion or tincture of snake-root, with from twenty to thirty drops of the æther in each draught; warm pediluvia should be ordered in the evenings, or the lower extremities should be fomented; whenever a general relaxation of the skin occurs, the bark combined with a small portion of the opiate confectio, and a few drops of the muriatic or sulphuric acid in each dose, should be given frequently, taking care at the same time not to oppress the stomach. A table-spoonful of yeast, either diluted, or in its pure state, has been of late much employed, and with a considerable degree of success; it should be given at least three or four times in the course of the day. At bed-time it will be proper to give an opiate, particularly if the patient is restless, and its effects will be promoted by combining it with about ten grains of the castor or camphor, or from fifteen to twenty grains of the compound powder of ipecacuanha, or a drachm of Hoffman's æther may be substituted; the last of which medicines, if it does not procure sleep, it does not, however, increase the heat or restlessness; if the hands and feet are at that time parched, the effects of the opium or other remedies will be promoted by moistening them with cold or tepid vinegar. If the head-ach is very distressing, blisters should be applied to the temples: should subsultus tendinum supervene, either æther, camphor, carbonat of ammonia, castor, or the musk, should be administered in large doses alternately with bark: the diet should be light and nourishing; bottled porter and wine should be allowed liberally, taking particular care that not the smallest degree of intoxication ensues: sedative and antispasmodic remedies may also be employed externally by means of friction; they have in many instances produced the most happy effects.

Dr. Currie, in his ingenious and valuable work, entitled Medical Reports on the Effects of Water, in Fevers and other Diseases, vol. i. p. 17, et seq. observes, when speaking of the aspersion or affusion of cold water, vinegar and water, or of a saturated brine, that the safest and most advantageous time for using either the aspersion or affusion (the latter of which he prefers), is when the exacerbation is at its height, which is marked by increased flushing, thirst, and restlessness, or immediately after its declination is begun; and this has led me always to direct it to be employed from six to nine o'clock in the evening; but it may be safely used at any time of the day, when there is no sense of chilliness present, when the heat of the surface is steadily above what is natural, and when there is no general or profuse sensible perspiration. It is at the same time highly necessary to attend to the precautions which the employment of this valuable remedy requires: 1. If the affusion of cold water on the surface of the body be used during the cold stage of the paroxysm of fever, the respiration is nearly suspended, the pulse becomes fluttering, feeble, and of an incalculable frequency; the surface and extremities become doubly cold and shrivelled, and the patient seems to struggle with the pangs of instant dissolution. I have no doubt from what I have observed, that in such circumstances the repeated affusion of a few buckets of cold water would extinguish life. This remedy should therefore never be used when any considerable sense of chilliness is present, even though the thermometer, applied to the trunk of the body, should indicate a degree of heat greater than usual. 2. Neither ought it to be used, when the heat, measured by the thermometer, is less than, or even only equal to the natural heat, though the patient should feel no degree of chilliness. This is sometimes the case towards the last stages of fever, when the powers of life are too weak to sustain so powerful a stimulus. 3. It is also necessary to abstain from the use of this remedy, when the body is under profuse sensible perspiration; and this cau-

tion is more important in proportion to the continuance of this perspiration. In the commencement of sweating, especially if it has been brought on by violent exercise, the affusion of cold water on the naked body, or even immersion in the cold bath, may be hazarded with little risk, and sometimes may be resorted to with great benefit. After the sweating has continued some time and flowed freely, especially if the body has remained at rest, either the affusion or immersion is attended with danger, even though the heat of the body at the moment of using it be greater than natural. Sweating is always a cooling process in itself, but in bed it is often prolonged by artificial means, and the body is prevented from cooling under it to the natural degree, by the load of heated clothes. When the heat has been thus artificially kept up, a practitioner judging by the information of his thermometer only may be led into error. In this situation, however, I have observed, that the heat sinks rapidly on the exposure of the surface of the body even to the external air, and that the application of cold water, either by affusion or immersion, is accompanied by a loss of heat and a deficiency of re-action, which are altogether inconsistent with safety. Under these restrictions the cold affusion may be used at any period of fever, but its effects will be more salutary in proportion as it is used more early. When employed in the advanced stages of fever, where the heat is reduced and the debility great, some cordial should be given immediately after it, and the best is warm wine. Dr. Currie, when speaking of the internal use of cold water, vol. i. p. 92. et seq. directs that, "1. Cold water is not to be used as a drink in the cold stage of the paroxysm of fever, however urgent the thirst. Taken at such times, it increases the chilliness and torpor of the surface and extremities, and produces a sense of coldness in the stomach, augments the oppression on the præcordia, and renders the pulse more frequent and more feeble. 2. When the hot stage is fairly formed, and the surface is dry and burning, cold water may be drunk with the utmost freedom. Frequent draughts of cold liquids at this period are highly grateful; they generally diminish the heat of the surface several degrees, and they lessen the frequency of the pulse. When they are attended with these salutary effects, sensible perspiration and sleep commonly follow. Throughout the hot stage of the paroxysm cold water may be safely drunk, and more freely in proportion as the heat is farther advanced above the natural standard. It may even be drunk in the beginning of the sweating stage, though more sparingly. Its cautious use at this time will promote the flow of the sensible perspiration, which, after it has commenced, seems often to be retarded by a fresh increase of animal heat. A draught of cold water taken under such circumstances will often reduce the heat to the standard at which perspiration flows more freely, and thus bring the paroxysm to a speedier issue. 3. But, after the sensible perspiration has become general and profuse, the use of cold drink is strictly to be forbidden. At this time I have perceived, in more than one instance, an inconsiderate draught of cold water produce a sudden chilliness both on the surface and at the stomach, with great sense of debility, and much oppression and irregularity of respiration. At such times, on applying the thermometer to the surface, the heat has been found suddenly and greatly reduced. The proper remedy is, to apply a bladder filled with water heated, from 110°, to 120°, to the pit of the stomach, and to administer small and repeated doses of laudanum."

Dr. Cullen divides this disease into two varieties: *typhus mitior*, or low nervous fever, being that we have now described; and *typhus gravior*, jail, camp, or hospital fever; far more violent in its symptoms, rapid in its progress, infectious in its effluvium, and fatal in its tendency. It becomes the medical practitioner, therefore, to be proportionably more bold and active, with which general observation, the same mode of treatment may for the most part be pursued. The stimulant plan must be pushed to a much greater extent, and affusions of cold water are here of more use than in the preceding variety, and of course ought to be employed with the most liberal and unhesitating attention.

Symptoms of Synochus.—This, as we have already observed, is a fever compounded of those that characterise the first stage of synocha or inflammatory fever, with which it commences, and of those which constitute the middle and last stages of typhus or putrid fever, into which it becomes converted by a sudden and oftentimes a very unexpected change. It is a common fever in the large manufacturing towns of this country; and great care is necessary on its first appearance, that it be not mistaken for, and consequently treated as an inflammatory attack by venesection, and a strict debilitating plan. This is the general caution on its commencement, or while we are in doubt; in its farther advance, the treatment must be adapted to the different symptoms it exhibits, as more nearly approaching to the nature of the synocha or typhus, and should be governed by the regulations already laid down for the treatment of these diseases.

Under this genus Dr. Cullen has ranged *hectic fever*; whilst he makes *phthisis*, of which he admits it to be only a symptom, under a genus of another order, which he denominates *hæmorrhagiæ*. It cannot therefore be considered as entitled to any notice in the present place, and we shall consequently transfer it to that to which it more properly belongs.

Order II.

Phlegmaticæ. Inflammations.—Topical inflammations or phlegmatiæ are a very numerous assemblage of diseases: their chief characteristics are the general symptoms of fever, and a topical inflammation attended with the lesion of some important function; in which usually, upon blood-letting, the blood is found upon coagulation to be covered with a buffy coat. This order comprehends the following eighteen genera.—1. Phlogosis, of which upon the Cullenian system there are two species; P. phlegmon, and P. erythema, or cutaneous erysipelas. 2. Ophthalmia, inflammation of the eyes. 3. Phrenitis, inflammation of the brain. 4. Cynanche, sore throat or quinsy. 5. Pneumonia, inflammation of the lungs. 6. Carditis, of the heart. 7. Peritonitis, of the peritonæum. 8. Gastritis, of the stomach. 9. Enteritis, of the intestinal canal. 10. Hepatitis, of the liver. 11. Splenitis, of the spleen. 12. Nephritis, of the kidnies. 13. Cystitis, of the urinary bladder. 14. Hysteritis, of the womb. 15. Rheumatismus, rheumatism. 16. Odontalgia, inflammatory tooth-ach. 17. Podagra, gout. 18. Asthropuosis, inflammation of the hip.

By far the greater number of these are of the same natural family, and require the same mode of treatment; and several we have already noticed in the article Dietetics. Whatever be the organ affected, with the very few exceptions we shall

presently point out, the inflammation must be attacked with applications both general and topical, and powerful in proportion to the degree of inflammation: venesection, cathartics of calomel, and laxative injections may be safely recommended as a part of the general practice; local bleeding by cupping, wherever it can be employed, and where it cannot, by leeches, should constitute an essential feature of the plan, and be repeated according to the urgency of the symptoms. In most of these diseases benefit may also be obtained by frigid lotions, as of common spring-water, ice-water, vinegar; while the general symptomatic fever, if considerable, must be attacked by the process of cure already laid down in the treatment of fevers, and varied according to the phænomena that arise. Where the cause is obvious, as in many cases of ophthalmia, or inflammation of the intestines, we should be indefatigable till it be removed, since without the accomplishment of this point every thing else must be of no avail. These are general hints: yet several of the diseases arranged under this order are connected artificially alone, and not naturally, and require a distinct treatment. We shall briefly notice a few of them.

Erythema. As in this affection, notwithstanding the inflammatory appearance, there is frequently a considerable degree of debility, we must not push the antiphlogistic measures too far, particularly in debilitated habits, and in those advanced in life, for fear of inducing gangrene, but rather trust to wine, bark, combined with snake-root or camphor, and the sulphuric acid, together with local applications. Should there, notwithstanding all our efforts, be a tendency to gangrene, stimulate in a still higher degree: on the other hand, should there be any considerable danger of excitement, which, however, is rarely the case, accompanied with a hard, full, and strong pulse, blood-letting, repeated according to the violence of the symptoms and effects produced, will be necessary; at the same time it will be advisable to employ gentle cathartics: but the bark will usually be found the most efficacious remedy in every stage of this disease.

Cynanche.—Quinsy. Of this genius the Cullenian system makes five species. 1. C. tonsillaris. Common inflammatory sore-throat. 2. C. maligna. Malignant sore-throat, chiefly symptomatic of scarlet and other fevers of a putrid tendency. 3. C. trachealis. Croup; a disease most commonly of infancy. 4. C. pharyngea, a mere variety of C. tonsillaris, by its being extended to the pharynx. 5. C. parotidæa. Mumps: generally a slight inflammatory affection, and lasting only a few days, of the parotid and maxillary glands: though sometimes succeeded in men by symptomatic intumescence of the testes, and in women induration of the mammæ, usually, however, yielding to repellent applications and gentle aperients. If the head be affected by stupor or delirium from a similar sympathy, it should be bathed with warm water, and a few ounces of blood, according to the strength of the patient, should be taken from the arm.

Generally speaking, indeed, the common means employed in the removal of other local inflammations with the use of acid gargles is the plan to be adopted in cynanche. Yet the two following species require to be noticed separately.

C. *Trachealis.*—This disease very rarely attacks infants until after they have been weaned; it generally commences with a sensation of uneasiness, or somewhat of an obtuse pain about the upper part of the trachea, which is increased on pressure, or a sense of constriction is perceived in the neighbourhood of the larynx: upon inspecting the fauces, little or no tumor is generally observed; sometimes, however, there is some trifling degree of redness; a hoarseness and particular ringing shrill sound of the voice accompanies both speaking and coughing; the noise appears to proceed as from a brazen tube, and has been, not inaptly, compared to the crowing of a cock; there is dyspnœa, attended with a wheezing sound in the act of inspiration; the cough which attends the disease is commonly dry and short; if any thing is expectorated, it is puriform, and mixed with small portions of a whitish membrane, similar to what is found in the trachea upon dissection, which is, by that illustrious anatomist and physician, Dr. Baillie, supposed to be formed by some peculiar action of the blood-vessels of the inner surface of the larynx and the trachea, which is superadded to inflammation; the face is somewhat livid, or is flushed. With these symptoms, there is some degree of frequency and hardness of the pulse, great thirst, restlessness, and an unpleasant sense of heat; the deglutition is but little or not at all affected; the urine, at the commencement of the disease, is generally high-coloured, sometimes, however, it is limpid, but in the advanced stage it is turbid; there is seldom any delirium; sometimes, however, the patient seems stupid and mutters to himself; and often, in the perfect use of his senses, he is seized with great difficulty of breathing, and a sense of strangling about the fauces, and is suddenly carried off. This disease chiefly appears in the winter and spring; it generally attacks the most robust and ruddy children, and frequently comes on with the ordinary symptoms of catarrh.

The remotest causes are cold, combined with a moist state of the atmosphere; infancy; exposure to air passing over large bodies of water, and many of the causes producing the phlegmasiæ, and the other species of cynanche: this disease is said to be most frequently met with in marshy situations, and near the coast. The proximate cause appears to consist in an inflammation of the inner coat of the trachea and the larynx, together with an altered and peculiar action in the blood-vessels of the parts; and the adventitious membrane is the consequence.

Treatment.—We must attempt the cure of this disease by the remedies which are recommended for the removal of inflammation; blood-letting, both general and topical, must be immediately had recourse to, and it must be repeated according to the strength of the patient, violence of the symptoms, state of the pulse, and the effects produced from it: repeated emetics should be administered, and mild cathartics or laxative clysters should be at the same time employed; blisters should be applied to the external fauces, or stimulating liniments, as the liniment of ammonia with oil of amber and tincture of cantharidis should be made use of; the warm bath should be ordered, and the vapour of warm water with or without a portion of vinegar should be frequently received into the fauces; in every stage of the disease, the antiphlogistic regimen is peculiary necessary, and the patient should lie with his head raised high in bed: small repeated doses of the calomel have been administered with the best effects, at the commencement and throughout the whole course of the disease, as two or three grains two or three times in the course of the day. This disease sometime attacks adults, in which case the most powerful remedies against inflammation, together with

the employment of emetics, must be immediately had recourse to, and persevered in with assiduity. There appear to be two varieties of this complaint; the one just now described, which may be termed the inflammatory, and the spasmodic; which, from their different requisite mode of treatment, it will be necessary to discriminate. The inflammatory cynanche commonly attacks the patient in a gradual manner, and is generally preceded for a few days by slight symptoms of pyrexy: it never, when completely formed, intermits so as to lose its distinguishing mark, particularly in coughing; the heat, frequency of the pulse, and other symptoms of pyrexy are in a much greater degree in this than in the spasmodic species. The spasmodic cynanche always attacks the patient in a sudden manner, and usually in the night-time; it often intermits, and in the intervals both the respiration and cough, if any exists, are free from the characteristic sound of the above disease; it must of course be treated with antispasmodics, as the musk, camphor, asafœtida, the warm bath, and similar remedies.

C. Maligna. Malignant or putrid sore throat. This disease, whether primary or symptomatic, is marked by frequent cold shiverings, alternating with fits of heat, giddiness, lassitude, anxiety, depression of spirits, nausea, and vomiting: these symptoms seldom continue long before the patient complains of a sense of stiffness in the neck, some uneasiness in the internal fauces, and hoarseness; the internal fauces, when viewed, appear of a dark red colour, are but little or not at all swollen, and deglutition is seldom attended with difficulty or pain. In a short time, a number of white, ash-coloured, or brown spots make their appearance upon the inflamed parts; these spread, run together, and cover the greatest part of the fauces with thick sloughs, which, upon falling off, discover deep ulcerations: as the disease advances, these symptoms are generally attended with a coryza, which pours out a thin, acrid, and fetid matter, which excoriates the nostrils, lips, and sometimes every part it touches: in infants diarrhœa is a more frequent occurrence than in adults, and the thin acrid matter evacuated excoriates the anus and neighbouring parts. The fever increases with the other symptoms; the skin is dry, parched, and accompanied with a biting heat; the eyes become red, heavy, and watery; the countenance is either full and bloated, or pale, shrunk, and dejected, and the patient frequently complains of an unusual sense of oppression and debility; the pulse is small, frequent, and irregular; the respiration is more or less hurried, and as the disease advances the breath becomes very fetid, and is often disagreeable to the patient himself; and there is generally a considerable discharge of a sanious-like matter from the fauces; the voice is frequently very much altered, and when the inflammation has attacked the organs of respiration, it assumes a wheezing or ringing sound, the respiration becomes difficult, and the patient is teased with a troublesome cough; the fever suffers an evident exacerbation in the evening, during which, some rattling is perceived in the breathing, and there is generally a remission in the morning; great debility, prostration of strength, and restlessness, accompanied with frequent sighing, as in the typhus gravior, supervene, and if neither delirium nor coma appeared at an early period, they generally come on in the progress of the complaint. On the second or third, rarely later than the fourth day, an erruption appears upon the skin, which, for the most part, in the first instance, shews itself upon the neck and breast; it comes out in blotches of a dark purple or raspberry hue, and gradually spreads over the trunk and extremities; the scarlet redness is often considerable on the hands and extremities of the fingers, which feel stiff and swelled; the stains, when nearly inspected, appear to be composed of small prominences, which may sometimes, although rarely, be distinguished by the eye, more frequently by the touch only; the erruption is as regular in its appearance as it is in its steadiness and continuance; it generally, however, disappears about the fourth day, and a desquamation of the cuticle takes place; but neither on its first appearance, nor on its desquamation, does it always produce a remission of the fever or of the other symptoms, except the vomiting, which generally abates on its first appearance. As the disease advances, the ulcers on the fauces become of a livid or black colour, the pulse becomes more depressed, and the symptoms attending the latter stages of the typhus gravior come on, and the patient is generally cut off either by a diarrhœa, or by a profuse hæmorrhage from the intestinal canal, nose, mouth, or ears, often on the third day, sometimes later, but for the most part before the seventh. The complaint sometimes spreads into the trachea; the parotid and the other lymphatic glands also in the vicinity of the fauces, in consequence of the absorption of the putrescent matter, are sometimes so much swollen as to endanger or induce suffocation.

Causes.—This disease is produced by a specific contagion, and those will be more liable to be attacked by it who are of a sickly habit of body, and who have been exposed to the remote causes of the typhus gravior: it has been frequently observed of this, as of most other epidemics, that it is most fatal on its first appearence, gradually becoming milder, till towards the end, when it is attended with scarcely any danger; at the same time, other complaints seldom prevail much while it rages, or if they do, are generally catenated with its symptoms.

Treatment.—In the management of this often fatal and insidious disease, we must keep its tendency to depression of strength and gangrene constantly in view, and at the same time attend to certain troublesome symptoms, which frequently accompany this disease. Emetics, at the commencement of the disease, must on no account be dispensed with; but as in this species of cynanche there is so great a tendency to diarrhœa, they should in general consist of the ipecacuanha only; sometimes, however, a small portion of Dr. James's powder may be added with advantage. The intestinal canal must be evacuated by the most gentle laxatives, for which purpose, the mercurial cathartics are particularly recommended; in the more advanced stages of the disease they will be improper, as there is generally a spontaneous diarrhœa: the regular expulsion of the feces should be solicited by clysters only; but towards the termination, when the bowels are loaded with putrid sordes, accumulated in them during the disease, which protracts the fever and impairs the appetite, gentle cathartics will be serviceable: even in this case we must not venture to employ them, unless the fauces have a healthy appearance, and there is a considerable abatement of the febrile symptoms. Small repeated blisters should be applied to the external fauces; rubefacients, however, may in general be employed with equal advantage and more safety; the fauces must be preserved from the effects of the acrid matter, discharged from the ulcers, by the diligent use of antiseptic or rather stimulating

gargles, as the decoction of bark with muriatic or sulphuric acid, or the bark in port wine, a small quantity of which should be frequently employed or injected into the fauces by means of a syringe; a small quantity of a gargle, composed of alum, in the proportion of an ounce to a pint of water, is recommended to be frequently injected into the fauces, which is said to remove the fœtor from the ulcers; but the most powerful gargle is prepared by mixing a teaspoonful or two of the capsicum annuum or Guinea pepper and a teaspoonful of sea-salt with three ounces of distilled vinegar, and the same quantity of boiling water, a small quantity of which is advised to be taken into the fauces every two hours, so as to produce and keep up a moderate degree of excitement on the tonsils, uvula, and fauces. Wine, opium, bark, mineral acids, and the other remedies recommended in the treatment of the typhus gravior, must be employed with assiduity. As children can rarely be prevailed upon to take the necessary medicines in sufficient quantities, the bark and cordials should be exhibited by clysters. Diarrhœa is to be checked by opiates and astringents, excepting it arise, as a salutary crisis, towards the close of the disease; in which case rhubarb in gentle doses is the very best moderating remedy.

Rheumatismus. Rheumatism.--Of this disease there are two species, the Acute and the Chronic. The former generally commences with the usual symptoms of fever, preceded or succeeded by acute and pungent pains in the joints; the pain is not, however, confined to the joints, but it frequently shoots along the muscles from one joint to another; the parts most commonly affected are, the hips, knees, shoulders, and elbows, more rarely the ankles and wrists; the pain is much increased upon the slightest motion, or even by the heat of the bed; there is some degree of swelling and redness in the parts most affected, which are painful to the touch; the pulse is frequent and full: and the patient is generally costive; the urine at the commencement of the disease is high coloured, and generally without sediment; but, on the remission of the symptoms, it deposits a lateritious one, and there is a tendency to sweating in this course of the disease, which rarely brings relief: an exacerbation of the febrile symptoms takes place every evening, and a remission towards morning, and the pains are most severe and most apt to shift their place in the night-time. Dr. Darwin suspects that rheumatism is not a primary disease, but the consequence of the translation of morbid action from one part of the system to another, which idea, he observes, is countenanced by the frequent change of place in rheumatic inflammation, and from its attacking two similar parts at the same time, as both ankles, and both wrists, and these attacks being in succession to each other; and he further remarks, that this accounts for rheumatic inflammation so very rarely terminating in suppuration, as the original cause is not in the inflamed part; but, instead of suppuration, a quantity of mucus, or coagulable lymph, is formed on the inflamed membrane, which is either re-absorbed, or lies on it, producing pains on motion long after the termination of the inflammation.

The remote *causes* of this disease are, frequent vicissitudes of the weather; cold suddenly applied to the body when under perspiration; the long continued application of cold, particularly when combined with moisture, as when damp or wet clothes are applied to the body or extremities for any considerable length of time; plethora; cold caught when the system is under the influence of the hydrargyrus; certain seasons of the year, as spring and autumn. The proximate cause is supposed to be an inflammation of the membranes, and tendinous aponeuroses of the muscles.

The *cure* of this species of the disease will be effected by removing the morbid excitement, by a strict adherence to the antiphlogistic regimen, by blood-letting, which must be repeated in proportion to the degree of strength and hardness of the pulse, and violence of the symptoms; we must not however push general evacuations too far, as they not only retard the recovery of the patient, but frequently induce an obstinate chronic state of the disease; topical evacuations, by means of leeches or cupping, may after general blood-letting be advantageously employed, when the pain becomes fixed in the joints, attended with some degree of redness and swelling; gentle saline or mercurial cathartics, or laxative clysters, should be frequently administered; a gentle diaphoresis should be excited by means of the neutral salts, or of saline draughts combined with nauseating doses of tartarised antimony and the sulphuric or nitrous spirit of æther, or camphor may be employed in combination with volatile salt of hartshorn; cooling mucilaginous diluents are to be taken freely; the diet should consist of food of little stimulus, and the cure will be further promoted by the warm bath: when the excitement has been subdued, bark combined with chalybeates, and the myrrh or opiates combined with ipecacuanha, may be administered with great advantage; rubefacients are of service, and blistering should be employed when the excitement is considerably reduced, and the pain is much confined to one part. Bark has of late been recommended to be administered in every stage of the disease, and there is no doubt that it may be employed, not only with great propriety, but with safety, if the pain be attended with distinct remissions, and assumes more or less the form of an intermittent; when the excitement, however, is considerable, it will be advisable to premise some general evacuations.

The remote *causes* of chronic rheumatism are, preceding acute rheumatism, cold applied partially to the body when heated, and most of the causes producing the other species. The proximate cause is supposed to be atony of the blood-vessels and muscular fibres of the part affected, together with some degree of rigidity and contraction in those fibres: and the removal of this complaint must be attempted by restoring the activity and vigour of the part affected, and also that of the system in general; by the usual remedies for this purpose; and especially by the use of guaiacum and other warm resins, mustard-seed, and horse-radish: with a local application of volatile liniments and the flesh-brush. The warm-bath, or Buxton waters, may also be employed with advantage.

Gout.—Of this disease there are four species or varieties, the Regular, Atonic, Misplaced, and Retrocedent: it is not necessary, however, to dilate upon each separately.

This disease sometimes makes its attack without any previous warning; in general, however, the inflammation of the joint is for some days preceded by great languor and dulness both of body and mind, doziness, giddiness, wakefulness, or unrefreshing sleep, wandering pains, a deficiency of moisture in the feet, and there is sometimes a coldness, numbness, and sense of prickling in the feet and legs; these symptoms are often, in a greater or less degree, accompanied with frequent cramps of the muscles of the legs and toes, an universal tur-

gescence of the veins, occasional chills, acidity and flatulence in the stomach, and an increased or impaired appetite; the appetite is, however, frequently more keen than usual on the day preceding the attack of the fit: on going to bed, the patient enjoys his usual natural sleep, until about two or three o'clock in the morning, when he is awakened by a very acute pain, most commonly in the first joint of the great toe; sometimes, however, it attacks other parts of the foot; the pain resembles that of a dislocated bone, and is attended with the sensation as if all but cold water was poured upon the part; there is, at the same time, more or less of a cold shivering, which abates as the pain increases in violence, and is succeeded by a hot fit; the pain, from the commencement, gradually becomes more violent; it is sometimes so acute, as to be compared to a dog gnawing the part, and that and the fever continue in the same state, accompanied with great restlessness, till next midnight, when they gradually remit, and after a continuance of twenty-four hours, from the commencement of the paroxysm, they commonly cease entirely; the patient falls asleep, during which a gentle perspiration generally comes on, and on waking, he finds the part affected somewhat red and swelled: for some days, the pain and fever return in the evening, but with a less degree of violence, and a remission takes place towards morning; and after these symptoms have continued for about ten or fourteen days, gradually becoming less severe, they generally cease altogether: costiveness, an impaired appetite, chilliness of the body towards evening, are also to be reckoned among the symptoms of this disease.

The indications of *cure* are, in the paroxysms, to moderate their violence and shorten their duration as much as can be done with safety; and in the intervals, to prevent the return of the paroxyms, or to render them less frequent and more moderate. The violence of the paroxysm will be moderated by blood-letting, which must be repeated according to the state of the pulse and degree of excitement, where the constitution is not worn down by repeated attacks; leeches should be applied to the inflamed parts, and gentle cathartics should be administered, these parts should also be exposed to cool or cold air, and diluting liquids should be taken freely: the application of cold water is at present a doubtful practice: the antiphlogistic regimen must be strictly adhered to; abstinence from wine, spirits, fermented liquors, and stimulating food, should be carefully enjoined, unless the system is very much debilitated, in which case, a more nourishing diet, and a small quantity of wine or of diluted spirits, may be allowed; after the excitement has been subdued by proper evacuations, blisters may be employed with advantage; they are recommended by that enlightened physician, Dr. Rush, to be applied to the legs and wrists; burning with moxa may be advised, or a cabbage-leaf applied to the part affected will often afford considerable relief; bootlets made of oiled silk are an useful application to gouty joints; when the violence of the symptoms is abated, opiates may be given with advantage, when the pain only returns during the night, and prevents sleep: when the constitution is broken down by repeated attacks of the disease, evacuations must be employed with caution, and it will, in general, be more advisable and safe to allow some animal food, and wine or diluted spirits; the parts affected should, at the same time, be wrapped in flannel, fleecy hosiery, or new combed wool, and a gentle diaphoresis should be excited; when a swelling and stiffness remain in the joints after the paroxysm has ceased, they will be removed by the diligent use of the flesh-brush, gentle exercise of the parts, and the Buxton or Bath waters taken at the fountain head; and where the gout has left a number of dyspeptic symptoms, the latter may be drank with considerable advantage; purging immediately after a paroxysm will be very apt to induce a relapse. In the intervals we must endeavour to prevent a return of the paroxysms, or to render them less violent, 1. by temperance, which should be regulated according to the age, habits of life, and constitution of the patient: it is very probable, that a diet consisting of milk, vegetables, and water, would prevent the recurrence of the disease; but in general, fish, eggs, the white meats, and weak broths, may be taken in small quantities once a day, and a little salted meat may be eaten occasionally, and weak wine and water, or small beer, may be taken at meals. As there is a disposition in the gout to return in the spring and autumn, a greater degree of abstinence in eating and drinking will be necessary at those seasons than at any other period; and if any of the premonitory symptoms are then present, and the vigour of the system remains unimpaired, the disease may be often prevented from occurring, by the loss of a few ounces of blood, or, perhaps, by an emetic or a gentle cathartic, and afterwards bathing the feet in warm water; a full dose of the tinctura opii might probably be of service. In the decline of life, or when the constitution is much debilitated, this abstemious mode of living must be commenced with caution, as it might be the means of inducing more violent and dangerous fits of the gout. 2. By moderate labour and gentle exercise, as riding on horse-back, but more particularly walking. 3. By avoiding cold, especially when it is combined with moisture; the feet should be kept constantly warm and dry, by means of socks and cork-soled shoes, and the patient should wear flannel next to the skin. 4. By the prevention of costiveness, by means of gentle laxatives, as aloetics, combined with soap and rhubarb, or oil of castor. 5. By tonics, as the bark, quassia, and chalybeates. 6. By the exhibition of alkalies in various forms, as the fixed alkali, both mlid and caustic, lime water, soap, and the absorbent earths; and lastly, by studiously avoiding the exciting causes. In the retrocedent species, strong stimulants both external and internal should be instantly employed with an unhesitating hand; and in the atonic species the diet should be peculiarly generous, and compounded of spices and other aromatics.

Order III.

Exanthemata. Eruptive fevers.—These consist of the following genera. 1. Erysipelas, or St. Anthony's fire. 2. Pestis; plague. 3. Variola; small-pox. 4. Varicella; chicken-pox. 5. Rubeola; measles. 6. Miliaria; miliary fever. 7. Scarlatina; scarlet fever. 8. Urticaria; nettle-rash. 9. Pemphigus; bladdery fever. 10. Aphthæ; thrush. The whole of this order is defined by Cullen to consist of diseases affecting persons only once in their life, commencing with fever, and succeeded by phlogoses generally small in size, considerable in number, and dispersed over the skin. The definition, however, will not hold good in several of its clauses, and especially in its first: for perhaps there is not a single disease in the list but what has occasionally recurred, and many of them repeatedly. It is to be remarked through the whole of these, that whatever danger may accompany them depends rather upon the degree of fever, and the nature of the fever that introduces them,

than upon the extent or nature of the eruptions themselves: and hence, with very few exceptions, the genera, plan laid down for the treatment of the different genera in the order Febres is the plan which ought to be followed in the order before us. Thus the fever accompanying plague is evidently typhus, which, in effect, when accompanied by eruptions of any kind, is evidently a typhoid eruptive fever, and requires the same treatment as typhus. Chicken-pox and nettle-rash have a near approach to synocha, and so far possess the same indications; but they are generally slight diseases, and of not more than three days duration. The rest, for the most part, are of a mixt breed, and have hence a closer resemblance to synochus: they commence with inflammatory affections, but have soon a strong tendency to run into the putrid type. We shall select an example or two from the diseases of this order either most important or most frequent.

Variola. Small-pox.—This is of two varieties, the distinct and the confluent. The general nature, symptoms, and treatment of the former, are so well known, that it is unnecessary to repeat them. In the confluent kind, our chief attention must be directed to support the strength of the system, and to obviate the tendency to great depression of strength and putrefaction of the fluids, which will be effected by the exhibition of cordials, wine, bark, mineral acids, and nourishing diet, and by all the means recommended in the treatment of typhus, except the application of cold water after the appearance of the eruption; the bowels should be kept regular by the mildest cathartics, or by laxative clysters; some authors, however, recommend a more liberal use of them, unless a diarrhœa has supervened, even when the disease assumes the type of typhus; when the disease is attended with violent symptoms, blisters should be applied in succession, on different parts of the body, without regard to the parts being covered with pustules; if there be obstinate vomiting, the saline draughts should be given in a state of effervescence; or camphor, combined with opium, may be employed with advantage, the extract of cascarilla administered in some aromatic liquid: is often of use in allaying the vomiting; and if we do not succeed by those means, it will be proper to apply a blister to the region of the stomach: should the epileptic fits continue violent, it will be necessary to administer opiates, both by the mouth and by clysters, which act not only by their antispasmodic power, but also by perspiration, and mustard cataplasms should be applied to the feet; at the same time gentle cathartics will be necessary, as the recurrence of the fits frequently proceeds from the irritation of retained feces, especially in children: when a retrocession of the eruption happens, wine, opium, volatile alkali, musk, and camphor, with the warm bath, are the remedies most generally employed; blisters and mustard cataplasms should also be applied to the lower extremities: if the swelling of the face subsides suddenly, and is not succeeded by the swelling of the hands, blisters are recommended to be applied to the wrists and fore arms; anointing great part of the body with mercurial ointment, or applying a large mercurial plaster to the scrobiculus cordis under the same circumstances, is often attended with good effects; if the salivation suddenly cease without any swelling of the hands, blisters should be applied to the wrists, and small doses of the ipecacuanha should be administered: should there be a suppression of urine, the patient should be exposed to a current of cool air; if this does not succeed, and he is not in a very debilitated state, and the heat of the body is steadily above the natural degree, it will be proper to dash cold water upon the legs, and perhaps to extend the affusion over the whole surface.

Rubeola. Measles.—This disease will be distinguished from the other exanthemata, by the dry hard cough, hoarseness, sneezing, watering of the eyes, coryza, dyspnœa, and great drowsiness, or coma. From catarrh, the greater violence of the febrile symptoms, the greater affection of the eyes, and many of the symptoms, accompanying the eruptive fever of measles, particularly the coma, will afford a ready diagnosis between the two diseases.

The *remedies* indicated in the cure of this disease are such as will obviate or remove the morbid excitement; blood-letting will therefore be requisite in proportion to the violence of the fever, cough, and dyspnœa, if the nature of the prevailing epidemic does not contra-indicate; but, as the danger at the commencement of the complaint is for the most part inconsiderable, that powerful remedy may, unless the excitement is very great, and threatens immediate danger or much subsequent debility, generally be reserved till after the period of desquamation, which is often succeeded by a more dangerous train of symptoms than any that have preceded; gentle cathartics are indispensably requisite in all cases, such as phosphat of soda, Epsom salts, infusion of senna, &c.; analogy is, however, greatly in favour of calomel; tepid mucilaginous diluents should be freely allowed; it will be advisable to excite a gentle diaphoresis by means of the saline draughts, with small doses of the tartris antimonii; the cough will be alleviated, and expectoration promoted by a solution of spermaceti, gum arabic, or of the pulvis tragacanthæ compositus, or the decoctum hordei compositum may be employed in considerable quantities; inhaling the vapour of hot water, the application of oil round the chest, and the pediluvium, or warm bath, will be found useful auxiliaries: should the cough and dyspnœa prove urgent, attended with pyrexia, or should they remain after the desquamation, blood-letting, either general or local, should be employed: we must, however, be cautious in reducing the strength of the patient; small blisters should be applied in succession about the thorax; the apartment in which the patient continues should be kept cool, he must not be exposed to cold air so freely as in the small-pox, as much disorder may be produced in the system, if, from such exposure, retrocession of the eruption should take place; the degree of temperature should, therefore, in a great measure be regulated by the patient's feelings: when the excitement is subdued by evacuations, and the cough remains the only troublesome symptom, opiates may then be given with great advantage, and at this period of the disease a change of air will be of the most essential service. As a morbid tendency remains for some time after this complaint, it will be not only advisable, but indispensably necessary, to administer gentle cathartics at proper intervals. If symptoms of pneumonia should supervene after the desquamation, blood-letting, both general and local, if the strength of the patient will admit of it, blisters, and the other remedies, which are mentioned when treating of that inflammation, must be diligently employed: when a diarrhœa remains troublesome after the desquamation has taken place, it must not be checked too hastily by the employment of astringents and opiates, on account of the tendency to inflammatory complaints which remains after the measles; the cascarilla, or colomba may, however, be employed in small doses,

before we have recourse to more powerful astringents; blood-letting will generally remove both the diarrhœa and cough; it will, therefore, be advisable to endeavour to check the diarrhœa by that evacuation, rather than employ astringents in the first instance. The putrid measles appeared in London in 1672, 1763, and 1768; and have appeared occasionally since: in this variety all the symptoms are more violent, accompanied with greater depression of strength: the remedies must be of the same kind, but more actively and instantaneously employed.

Scarlatina.—The general nature and treatment of this disease will be found in *Typhus* and *Cynanche Maligna.*

Erysipelas. St. Anthony's fire.—This disease will be readily distinguished from the scarlatina cynanchica by the absence of the pain, redness, tumour, and sloughs, in the fauces and tonsils, and by the other concomitant symptoms. The danger will be in proportion to the violence of the symptoms denoting a tendency to an affection of the brain; the parts which were red becoming suddenly pale, and a considerable degree of coma or delirium, particularly at the commencement of the disease, with an increase rather than diminution of it, after the appearance of the eruption, are symptoms of the utmost danger. When the disease terminates in a favourable manner, there is sometimes a gentle diaphoresis; more frequently, however, the disease goes off without any evident crisis.

In the removal of this disease, if there is a considerable degree of excitement, attended with much coma or delirium, and a strong, full, and hard pulse, blood-letting will be necessary, and it should be repeated according to the urgency of the symptoms, strength of the patient, and state of the pulse; an emetic should be given at the commencement of the fever, unless the head is affected, in which case it is at least a doubtful remedy; cooling purgatives are particularly useful; mild diaphoretics, assisted by the plentiful use of mucilaginous acidulated diluents, will be proper; the antiphlogistic regimen must be strictly adhered to, and the patient should be placed in as erect a posture as he can bear without inconvenience; if the delirium, but more particularly the coma, is urgent, blisters should be applied to the shaved head, or between the shoulders, cupping should be advised, and mustard cataplasms should be put upon the soles of the feet. The erysipelatous eruption sometimes shews itself in typhus, and increases the fever, in which case, we must have immediate recourse to bark, wine, cordials, the sulphuric acid, and the other remedies for that disease. Where the eruption returns periodically, issues and a low diet will frequently prevent it.

ORDER IV.

Hemorrhagiæ. Sanguineous fluxes.—These are thus ordinally defined; pyrexy, with a flow of blood without external violence; the blood upon venæsection exhibiting the same appearance as in phlegmasia. The genera are: 1. Epistaxis; bleeding from the nose. 2. Hæmoptysis; spitting of blood. 3. Hæmorrhois; piles. 4. Menorrhagia; immoderate menstruation. This, for the most part, and when the profusions are not merely symptomatic or critical, are a natural class of diseases; and, excepting in one or two instances, are to be attacked by a general plan of a similar kind and tendency. They are preceded for a longer or shorter time by a sense of fulness and tension in the parts whence the blood is about to issue; if these parts be visible there is redness, tumour, a sense of heat or itching, and of pain and weight: internally in the neighbourhood, there is a similar sense, weight, fulness, tension, heat, and pain; and when these symptoms have subsisted for some time, a cold fit comes on, attended with weariness of the limbs, pains of the back and head, costiveness, and other febrile symptoms, succeeded by a hot fit, in the course of which the blood most commonly flows in a greater or less quantity, and after an uncertain time it ceases spontaneously; during the hot stage, the pulse is frequent and full, and in many cases hard, but as the blood flows, the pulse becomes softer and less frequent, and the blood, when drawn from a vein, appears as in the cases of the phlegmasiæ. After an hæmorrhage has once occurred, it frequently observes periodical returns.

The remote causes are, a plethoric and sanguine temperament; the suppression or diminution of accustomed evacuations; changeable weather, as spring and autumn; considerable and sudden diminution in the weight of the atmosphere; external heat; violent exercise of particular parts of the body; whatever increases the force of the circulation, as violent exercise, violent efforts, anger, and other violent active passions; postures of the body increasing determinations to, or ligatures occasioning accumulations in, particular parts of the body; a determination to certain vessels rendered habitual from the frequent repetition of hæmorrhage; mal-conformation of particular parts, and lastly cold externally applied, as changing the distribution of the blood, and determining it in greater quantities into the internal parts, or, perhaps, by its exciting some degree of synocha. The proximate cause is supposed to be congestion in particular parts of the sanguiferous system, occasioning distention of these vessels, and violent re-action, the consequence of which is a rupture of them.

Treatment.—When an hemorrhage has taken place, and threatens to go to excess, we must endeavour to moderate or check the flow of blood, and prevent its return: the first indication will be answered by a strict adherence to the antiphlogistic regimen, therefore the removal of every cause of irritation is always necessary, the patient must be kept quiet and still, heat must be particularly guarded against, he should be freely exposed to the cold air, and should be allowed cold or iced water, or iced lemonade to drink; every exertion of mind or body is to be avoided; a vegetable diet will be most proper, unless the strength of the patient is greatly exhausted, in which case, mild broths, and the mildest kind of animal food, may be allowed; gentle cathartics or laxative clysters will be necessary to prevent any accumulation of the fæces, and blood-letting will be requisite, if there is a considerable degree of excitement; dry-cupping is frequently useful, and blisters may be employed with advantage: vomiting is a powerful remedy in diminishing the action of the heart and arteries; the digitalis, however, in our opinion, is a much more preferable remedy; refrigerants should be ordered, as the sulphuric acid, nitre, cream of tartar, and the vegetable acids, the first of which is, however, the most efficacious medicine. Internal and external astringents must also be employed; of the former class are the vitriolic acid, alum, and the sugar of lead, which is by far

the most powerful remedy, and may occasionally be exhibited with advantage in small doses, but the long continued use of this remedy is often attended with dangerous consequences, and it should be given in combination with the opium pill, or some tenacious extract, in order to obviate its pernicious effects on the stomach and bowels. The external astringents in most general use are, cold applied suddenly, cold water, in which salt has been recently dissolved, or powdered ice, or solutions of sugar of lead, alum, or white vitriol, &c.; pressure is a powerful means of checking hæmorrhage, when it can be applied to the part; when the hæmorrhage is very profuse, it is improper to employ any means to prevent syncope, unless it partakes very much of the passive state, in which case it must be prevented by every possible means; the cinchona with chalybeates are indicated under the same circumstances: when the phlogistic diathesis is taken off, either by the continuance of the hæmorrhage, or by proper remedies, opiates may be given with advantage, and should subsultus tendinum, or convulsions supervene, they are particularly serviceable, combined with the camphora, castoreum, and the moschus. The return of the hæmorrhage is to be prevented by our counteracting or preventing a plethoric state of the system, by an abstemious diet, or by taking food of a less nutritious quality, by exercise, gestation will be generally more safe than walking, by gentle cathartics, by cold bathing, bitters, and aromatics, which tend to prevent plethora, by increasing the tone of the vessels, and by studiously avoiding the remote causes; tonics, which must increase the force of the circulation, although indicated, are doubtful remedies, in particular bark and chalybeates; astringents are in general more efficacious, particularly the sulphuric acid, alum, &c. If the plethoric state, notwithstanding our endeavours, should become considerable, and a return of the hæmorrhage is threatened, blood-letting, both general and local, and blisters, will be proper when the vis a tergo is great, but when the habit is debilitated, it will be more advisable to employ only local blood-letting and blisters; it will be proper to remark, that blood-letting should always precede the employment of blisters.

These directions will suffice for the treatment of hæmorrhagies in general. Upon menorrhagia we shall enter more fully in the article MIDWIFE, and shall only in the present place offer a few words on phthisis.

Phthisis, pulmonary consumption, upon the Cullenian system is made a species of hæmoptysis. The impropriety of thus naming a disease from a single and that only an occasional symptom must be obvious to every one. But our only duty at present is to describe the disease. This is generally preceded by more or less of the following symptoms; a slight degree of fever, increased by the least exercise; a dry burning heat of the palms of the hands, particularly towards evening, and of the soles of the feet towards morning; moisture of the eyes after sleep; irregular flushings; hoarseness; a dry, troublesome, and sonorous cough, occasioning slight pain or stitches, most commonly in the sides; some degree of hardness of the pulse; lancinating or fixed pains in the thorax; headache; frequent fainty fits; some degree of dyspnœa, increased on using exercise; an expectoration of a small quantity of thin, frothy matter; impaired appetite; restless nights, and universal disinclination to motion or exercise: this may be termed the inflammatory or first period. In a short time the fever becomes more severe, with accessions in the afternoon or evening, and some remission in the morning, the pulse, however, is even then quicker than natural: the cough is increased by a recumbent posture, and prevents sleep till towards morning, when a slight moisture appears upon the breast and upper parts of the body; the expectoration increases in quantity, is frothy, and sometimes streaked with blood; the face is commonly pale, but during the fever the cheeks appear as if painted with an almost circumscribed spot of pure florid red; the feverish heat is augmented after eating, particularly solids, and on taking exercise; the burning heat in the palms of the hands and soles of the feet becomes more perceptible; there is difficulty of lying on one more than the other side, wandering or fixed pains are felt in some part of the thorax, and the disease is accompanied with lassitude and asperity of the temper: the appetite becomes somewhat impaired, and there is frequently vomiting after eating. As the disease advances, the hectic fever is established, and the remissions become more distinct, attended with colliquative morning sweats; an exacerbation occurs about noon, and a slight remission happens about five in the afternoon; this is soon succeeded by another exacerbation, which gradually increases until after midnight, but after two o'clock in the morning a second remission takes place, and is attended with more or less, sometimes profuse, sweating, which greatly debilitates the body; sometimes, however, the second exacerbation in the evening is not observed, but the exacerbation, which took place about the middle of the day, increases till evening, continues violent until the morning sweat breaks out, when the patient gets some unrefreshing sleep; the exacerbations are frequently attended with some degree of cold shivering, or more frequently only a sense of chillness or increased sensibility to cold is perceived, when to the thermometer the skin is preternaturally warm: the expectoration now becomes more viscid, copious, yellow, greenish, streaked with blood, disagreeable to the taste, and is discharged in small spherical masses, resembling pus, and is frequently also of an ash-colour; the cough abates in violence, but not in frequency, and is more distressing in the first part of the night, the breathing is short and quick, and the breath has an offensive smell; the pulse is frequent, full, and tense, or small and quick; the countenance now gives evident signs of wasting, the eyes lose their lustre and brilliancy, sink, grow dull and languid, the cheeks appear prominent, the nose sharp, the temples depressed, and the strength rapidly declines; this may be esteemed the second period: from the beginning the appetite is less affected than could be expected, the body is for the most part costive, particularly after the morning sweats have begun to take place; the urine is generally high coloured, and deposits a curdly pink sediment; about this period, in females, sometimes sooner, the menstrual discharge ceases in consequence of the increasing debility. The third stage commences with a slight purging, which soon becomes a colliquative diarrhœa; when this takes place, the fever, heat, and morning sweats abate, but the cough continues distressing through the night: the tunica adnata becomes of a pearly white, the tongue appears clean, and with the fauces, is of a bright red colour, sometimes covered with aphthæ, and generally sore and tender; the voice grows hoarse, and there is shortness of breath and hiccup, both of which distress the pa-

fient greatly; the lower extremities swell, and retain the impression of the finger; at this stage of the disease, sometimes sooner, the appetite is observed to become unnaturally keen, which deludes the unhappy sufferer and friends: as the disease advances, the diarrhœa becomes more violent, and sometimes alternates with the sweats, the strength rapidly decays, and memory and their affections forsake them; as the fatal period approaches, they have frequent and long faintings, the hairs fall off, the nails are incurvated; sometimes there are slight convulsions, and a few days before death delirium comes on, and continues till that event takes place, or the senses remain entire, and the mind continues still confident and full of hope, till death steps in and gently puts an end to their hopes and sufferings. As it is a matter of consequence to distinguish pus from mucus, we shall subjoin the following ingenious experiments of the late Mr. Charles Darwin.

1. Pus and mucus are both soluble in the sulphuric acid, though in very different proportions, pus being much the less soluble. 2. The addition of water to either of these compounds decomposes it; the mucus thus separated either swims on the mixture, or forms large flocci in it; whereas the pus falls to the bottom, and forms, on agitation, an uniform turbid mixture. 3. Pus is diffusible through a diluted sulphuric acid, though mucus is not; the same occurs with water, or a solution of the muriate of soda. 4. Nitrous acid dissolves both pus and mucus; water added to the solution of pus produces a precipitate, and the fluid above becomes clear and green, while water and the solution of mucus form a dirty coloured fluid. 5. Alkaline lixivium dissolves (though sometimes with difficulty) mucus, and generally pus. 6. Water precipitates pus from such a solution, but does not mucus. 7. Where alkaline lixivium does not dissolve pus, it still distinguishes it from mucus, as it then prevents its diffusion through water. 8. Coagulable lymph is neither soluble in diluted, nor concentrated sulphuric acid. 9. Water produces no change on a solution of serum in alkaline lixivium, until after long standing, and then only a very slight sediment appears. 10. The muriate of mercury coagulates mucus, but does not pus. From the above experiments, it appears that strong sulphuric acid and water, diluted sulphuric acid, and caustic alkaline lixivium and water will serve to distinguish pus from mucus; that the sulphuric acid can separate it from coagulable lymph, and alkaline lixivium from serum; and hence, when a person has any expectorated material, the composition of which he wishes to ascertain, let him dissolve it in sulphuric acid, and in caustic alkaline lixivium, and then add pure water to both solutions; and if there is a fair precipitation in each, he may be assured that some pus is present: if in neither a precipitation occurs, it is a certain test that the material is entirely mucus: if the material cannot be made to dissolve in alkaline lixivium by time and trituition, we have also reason to believe that it is pus. To the above ingenious experiments may be further added, the coagulation of pus by the muriat of ammonia, as observed by Mr. Home, and its globular appearance through the microscope; pus is also of the consistence of cream, of a whitish colour, and has a mawkish taste; it is inodorous when cold, and when warm it has a peculiar smell.

The predisposing *causes* are, hereditary disposition; mal-conformation of the chest; sanguine temperament; scrofulous diathesis, which is indicated by a fine, clear, and smooth skin, large veins, delicate complexion, high-coloured lips, the upper one swollen, white and transparent teeth, light hair, and light blue eyes, with a dilated pupil; there is great sensibility, uncommon acuteness of the understanding, and a peculiar gentleness and softness in their manner; the immoderate use of venery; certain diseases, as the hooping-cough; syphilis, and various exanthemata, particularly the measles; various employments, as stone-cutters, needle-grinders, flax-dressers, and all sedentary occupations, particularly those which require a considerable degree of stooping; the retrocession of eruptions; indulgence in intoxicating liquors, and, according to Dr. Beddoes, hyper-oxygenation of the blood. The exciting causes are, hæmoptysis; empyema; catarrh, particularly the influenza; asthma; obstructions of the abdominal viscera, particularly an enlarged and indurated state of the liver; calculi formed in the lungs; contagion and tubercles. The proximate cause is supposed to be an ulcer in the lungs.

The *prognosis* in this disease depends upon the causes from which it originates, and upon the violence of the symptoms; if it is in consequence of empyema or tubercles, there is more danger than when it arises from hæmoptysis or wounds in the chest, but every case of phthisis is always attended with danger: the progress of phthisis is often interrupted by pregnancy and mania; the latter has produced a radical cure, but in the former it almost always returns after delivery with increased violence.

In the *treatment* of this disease it will be particularly expedient to avoid, and if in our power, to remove the occasional causes mentioned above, by the proper methods, which are mentioned in other parts of this treatise; if several of the premonitory symptoms, as a dry, short, troublesome cough, occasional stitches in the sides, slight dyspnœa upon using exercise, and a pulse somewhat accelerated and hard, should attack a person of a phthisical habit, the most powerful remedies must be employed without loss of time: blood-letting in a moderate quantity will be necessary, and it should be repeated at proper intervals till those symptoms are relieved, taking care, however, not to reduce the strength of the patient too much, as debility is the most urgent symptom in the course of the disease: the bowels should be kept regular by gentle cathartics, as the calomel and rhubarb. After these evacuations, the ipecacuanha, either alone or with a small quantity of emetic tartar, should be given in the morning fasting, in such doses as will excite vomiting once or twice at most; when the heat, fever, cough, and pain in the chest are considerable, small doses of the nitre, or the saline mixture, with nauseating doses of the emetic tartar, should be given three or four times in the course of the day: in this stage of the disease, small doses of the calomelas administered at bedtime are of considerable service, except there is a tendency to diarrhœa, as the bowels, by its use, are not only kept regular, but it, at the same time, acts as a powerful deobstruent, and, in our opinion, an alterative course of mercury is of advantage, in the incipient stage of phthisis, for the removal of indolent tubercles: should the cough prove violent, opiates may be given at bed-time, and in the night if necessary, the extractum papaveris albi, in doses of five grains or more, is particularly suitable; if there is a fixed pain in the breast or sides,

increased upon coughing, local blood-letting and small blisters applied in succession about the thorax will afford considerable relief, or a seton may be made as near the part affected as possible. In the second stage of the disease, the employment of emetics, composed of the ipecacuanha with a few grains of the sulphat of zinc, must be duly persisted in, in the morning fasting: when the morning sweats are very profuse, the infusion of roses or vitriolic acid should be employed with freedom; æther, in the proportion of two or three drachms to a pint of water, with some of the mucilage of quince seeds, makes a grateful and slightly tonic mixture, a glassful of which may be taken frequently, or the Bristol or Seltzer water may be drank; they are very efficacious in moderating the thirst, burning heat of the palms of the hands and soles of the feet, and the partial night sweats; opiates must be given in such doses as will quiet the cough and procure sleep, taking care, however, to obviate costiveness, and if the patient feels a sickness in the morning after them, coffee will effectually remove it; mucilaginous fluids, combined with small quantities of the spermaceti, are also of service in allaying the irritation in the fauces. When the inflammatory diathesis is subdued, chalybeates, combined with myrrh and carbonat of potash, may be given with advantage; lime-water is a suitable menstruum for dissolving the myrrh. The digitalis is strongly recommended in these two stages in particular; it certainly is deserving of a fair and impartial trial, and appears to be a medicine well suited to this disease, more especially in the inflammatory stage, from its well known power of rendering the action of the heart and arteries more slow than natural, a desideratum in phthisis, in which the pulse ranges from eighty to one hundred and twenty, or more; it also is very efficacious in exciting the action of the absorbents: the factitious airs may also prove an useful auxiliary, or air impregnated with the oxyd of zinc, or manganese in their most comminuted state, might be applied to the lungs by means of an apparatus, as recommended by Dr. Darwin in his Zoonomia, or by that of Mr. Watt of Birmingham: the vapour of a saturated tincture of æther, impregnated with hemlock, may be inhaled; it is made by macerating for a few days from one to two scruples of the dried leaves of the conium in an ounce of the æther. The hectic paroxysm may be prevented, or cut short, by the affusion of tepid water at the commencement of the hot stage, or its effects may always be moderated by moistening the palms of the hands and soles of the feet with vinegar or cold water; it should always be resorted to, when the burning heat mentioned above is present; it is not only perfectly safe, but highly refreshing. In the third stage, should the above plan not be adopted in time, and diarrhœa has made its appearance, the gentle emetics before mentioned are recommended to be administered, provided the strength of the patient is not too much exhausted; mild astringements should at the same time be employed, as the decoction of hartshorn, or logwood, angustura, columba, kino, and mucilaginous demulcent liquors, combined with opiates and absorbents. During the inflammatory period of phthisis, a vegetable diet, with milk, is indispensably requisite; souins, sago, barley, and rice, afford an agreeable variety; the lichen islandicus is strongly recommended, and is deserving of a trial; the ripe subacid fruits may be indulged in at pleasure, attention must, however, be paid to the state of the bowels: oysters, muscles, craw-fish, lobsters, and the testacea in general, also flounders and whitings, may be allowed occasionally; provided they do not disagree with the stomach, and do not aggravate the symptoms. In the advanced periods, when the hectic is completely formed, a small portion of animal food may be taken for an early dinner, if it does not greatly increase the heat, and when the appetite becomes voracious, which it sometimes does towards the fatal termination, small quantities should be taken frequently: the drink, in almost every period of the disease, should consist of toast and water, Malvern water, milk and water, butter-milk, rice water, or the juice of ripe subacid fruits mixed with water, and occasionally lemonade. Wine, spirits and fermented liquors of all kinds must be strictly prohibited, and the practice of mixing rum and other spirits with milk cannot be too strongly reprobated; where, however, there is but little increased excitement, and the pain is inconsiderable, a more nourishing diet and a moderate quantity of wine may be allowed, but the wine should be more or less diluted with water, and in the purulent stage, an invigorating diet always affords more or less relief. During the whole course of the disease, every irregularity and all crowded places must be studiously avoided; the patient should be advised to repair to Bristol in the early part of the disease, and should make use of such exercise as his strength will bear, as swinging, gestation in a carriage, or riding on horseback in progressive journeys, or the alternation of this last exercise and gestation in a carriage, but a sea voyage is the most effectual of all kinds of gestation: the patient must by all means avoid the piercing north-east winds in this country; it will, therefore, be advisable for him to visit a temperate southern climate during the winter and spring: the patient should be advised to lie on a hair mattress, with slight coverings over his body, and should be earnestly requested to go to bed early, and to get up soon in the morning, even if obliged, through debility, to lie down in the course of the day: the feet should be kept dry and warm, and the patient should wear flannel or cotton next to his skin; the former, however, is far more salutary: in the florid consumption, an elevated and inland air is often of the most essential service. Should we be so fortunate as to subdue this too fatal disease by the means recommended above, it will be indispensably requisite for the patient to persevere in employing the regimen recommended in the treatment of this complaint, for a considerable length of time after every symptom of the disease has disappeared, and he must return to his former manner of living with the utmost caution; the diet should, however, be light and nourishing, and in moderate quantity: the patient should breathe a pure dry air, and should take such exercise, particularly on horseback, as he can bear without fatigue, and should use the warm bath; and when the constitution can be brought to bear it he may employ the cold bath or sea-bathing.

ORDER V.

Profluvia. Insanguineous fluxes.—These are ordinally characterised as consisting of pyrexy with an increased secretion, naturally void of blood. The genera are two. 1. *Catarrhus*; Catarrh. 2. *Dysenteria*; Dysentery. This order might easily be suppressed; and the genera it comprises transferred to other situations to which they more properly belong, even under the present nosology. Catarrh is described as possessing pyrexy; fre-

quently contagious; an increased secretion of mucus, or at least efforts to excrete it. Dysentery, as evincing contagious pyrexy; frequent mucus or bloody stools; while the alvine feces are for the most part retained; gripes; tenesmus.

Catarrh will be distinguished from the measles, by the greater mildness of the febrile symptoms, by the state of the eyes, by the absence of coma and many of the symptoms accompanying the eruptive fever of measles.

This disease is rarely attended with danger, except there is great difficulty of breathing, attended with a livid and bloated countenance, or has been treated with negligence or impropriety, in which case, it often passes into pneumonic inflammation, attended with symptoms of the utmost danger; in general, however, it is a slight and safe disease, unless it attacks persons of a phthisical habit, or those advanced in life; in the former it may occasion phthisis, and in the latter, peripneumonia notha.

For its *cure*, nothing more is requisite, in general, than abstinence from animal food for a few days, keeping the body warm, and drinking freely of tepid mucilaginous diluents; if there is, however, a considerable degree of excitement, blood-letting will be necessary, but it must be employed with some degree of caution, as it is frequently succeeded by depression of strength, particularly when catarrh is epidemic; if there be much oppression and tightness about the chest, occasioning a degree of dyspnœa, local blood-letting will be advisable, and blisters must be applied to the sternum and scrobiculus cordis; gentle laxatives should be ordered; the patient should take copious draughts of some mucilaginous acidulated liquids; a gentle diaphoresis should be promoted by nauseating doses of tartar emetic, with spirit of mindererus, or by exhibiting the volatile alkali in wine whey; the vapour of warm water, impregnated with vinegar, should be frequently inhaled; mucilaginous oily demulcents should be given, and expectoration should be promoted by the means pointed out when treating of pneumonic inflammation: if the cough remains troublesome, after we have subdued the inflammatory diathesis, opiates, combined with the tartar emetic, or with ipecacuanha, may be employed with safety and advantage: rubbing the nose externally with oil, some ointment, or, with what is most commonly employed, warm tallow, is very often of great service, when the mucus membrane of the nose is much affected, which practice has very frequently come under my observation. In the treatment of the epidemic catarrh (influenza), as being frequently attended with a considerable degree of debility, the antiphlogistic regimen must not be pushed too far, even though there may be some appearance of excitement; it will, in general, if blood-letting should be deemed necessary, be more advisable rather to trust to local than to general blood-letting, blisters, mild diaphoretics, and diluents; sometimes, however, a more liberal diet, and the moderate use of wine, will answer better. Might not the affusion of tepid, or even cold water, be employed with safety, if the heat of the surface is greater than natural, and there is at the same time no tendency to asthma or phthisis pulmonalis?

Dysentery is most commonly preceded by costiveness, unusual flatulence, acid eructations, and wandering pains in the bowels; in most cases, however, from the commencement, griping pains are felt in the lower part of the abdomen, which often arise to a considerable degree of severity: the bowels are irritated to frequent evacuation, in indulging which, but little is voided, and the rectum often becomes exquisitely painful and tender; the matter evacuated is often very fetid, and the stools are frequently composed of mucus, pus, blood, membranous films, and white lumps of a sebaceous nature; the mucus is generally mixed with a watery fluid, and is often frothy: tenesmus, in a greater or less degree, generally accompanies the evacuation of the bowels, and it very rarely happens that the natural fæces appear, during the whole course of the disease, and when they do, they are in the form of scybalæ, that is, small separate balls, which appear to have lain long in the cells of the colon; when these are voided, either by the efforts of nature, or as solicited by medicine, they procure a remission of all the symptoms, more especially of the frequent stools, griping, and tenesmus; with these symptoms there is loss of appetite, great anxiety about the præcordia, frequent sickness, nausea, vomiting, and the matter rejected is frequently bilious, watchfulness, and prostration of strength: there is always some degree of symptomatic fever, which is sometimes of the remittent or intermittent type; sometimes it assumes the synochous, and very frequently the typhous, type: the tongue is white, and covered with tough mucus, or rough, dry, and sometimes black; the patient complains of a bitter taste in the mouth, and in the advanced stage of the disease there is hiccup, and aphthæ. If the small intestines only are affected, the pain is described to be most acute and excruciating about the umbilicus, the bowels are not evacuated immediately after the griping pains, the blood is mixed intimately with the fæces, and the sickness, vomiting, and pain at the stomach, are more urgent; if the large intestines are the seat of the disease, the pain is more obtuse, not so constant, is more distant from the umbilicus, and is more immediately followed by stools, and the purulent matter or blood, if there is any, is less mixed with the rest of the excrements, or only floats upon them, and there is more sickness than griping; but it frequently happens, that both the large and small intestines are affected, which renders it very difficult to determine, with any certainty, the seat of the disease.

The remote causes are, cold alternating with heat, derangement of the primæ viæ, and contagion. The proximate cause is supposed to be a preternatural constriction of the intestines, more particularly of the colon.

This disease will be readily distinguished from diarrhœa, by the absence, or less degree of fever in the latter; the less degree of griping and tenesmus, the appearance of the stools, and the other symptoms in diarrhœa will further assist us.

Treatment.—When the patient is of a robust and plethoric habit, and the disease is attended with acute pain in the bowels, with a strong full pulse, blood-letting will be necessary, but it must be practised with caution, especially in warm climates, where the employment of powerful antiphlogistic measures is often succeeded by a sudden and dangerous degree of debility; gentle emetics should be administered, they are not only useful in emptying the primæ viæ, but they also determine to the skin; they will be more efficacious when given in such small and repeated doses as not to excite immediate vomiting, unless the oppression at the stomach is urgent; the emetics generally employed in dysentery are ipecacuanha and tartar emetic, and, at the early periods of the disease, they will be more efficacious when combined: the morbid and noxious contents of the intestines, the most

pernicious source of irritation in dysentery, must be expelled by cathartics; those most generally celebrated are the ipecacuanha and tartar emetic, the former is, however, most frequently employed; it may be given either alone, or in combination with the crystals of tartar, in such doses as will produce some degree of nausea, and repeated when the nausea abates; the calomel is an excellent remedy where there is a tendency to inflammation, but it should never be given alone; its operation is rendered both more easy and certain, by combining it with other cathartics; the most effectual remedy, however, in general, is a simple solution of Epsom salts, or Glauber's, or it may be given in a diluted infusion of senna, with a considerable proportion of manna; the cream of tartar with tamarinds, the phosphat of soda, and castor oil, will make an useful variety; after the operation of the cathartic is finished, it will be advisable to administer opiates, and they will be more efficacious if given with nauseating doses of emetics; the pulvis ipecacuanhæ compositus is a good medicine; the hyoscyamus, by its anodyne and gently laxative qualities, seems eminently adapted to this disease. The warm bath is often used with advantage; fomentation of the abdomen is more frequently serviceable, but the most effectual remedy is a large blister applied over the abdomen; in mild cases, however, so severe a remedy is not necessary; the addition of strong peppers to the fomentations may, in such cases, answer our intentions: the pain attending the tenesmus will be allayed by fomenting the anus with hot water, or with a decoction of chamomile flowers, with some tinctura opii sprinkled on the stupes: strangury is not an uncommon symptom; independent of cantharides, it will be effectually relieved by fomenting the pubes and perinæum: mucilaginous demulcent liquids must be given freely, for the purpose of defending the intestines against the acrimony of their contents, and mucilaginous and oily clysters should be employed once or twice a day, or more; they are very serviceable for the same intention as the mucilaginous liquids, and act also as a fomentation; they should consist of a strong decoction of linseed or starch, or they may be composed of milk and oil, united by means of mucilage. In the advanced and chronic stage of the disease, as acidity of the stomach chiefly prevails at that period, absorbents will be useful, as the mistura cretacea, aqua calcis, pulvis cretæ compositus, &c. combined with opiates; astringents will also, at this period of the disease, be proper, as the kino, hæmatoxylum, catechu, &c. and if the powers of the stomach are much weakened, they may be combined with chalybeates. The tone of the bowels will be restored, by administering quassia, bark, angustura, or colombo; an infusion of gentian and cinnamon in port wine is recommended; it will always be advisable to join aromatics with bitters: a purgative of the calomel and rhubarb should be given from time to time in this form of the disease, and when it remains obstinate, we may always suspect visceral obstruction; should this, upon examination, be the case, mercury, either internally, or by friction, should be employed until some sensible effect is producedin the mouth. The diet in the first stage should consist of milk, sago, panada, salep, Indian arrow-root (maranta arundinacea), and rice, the quantity being regulated by the appetite; the sweet and subacid fruits may be allowed, and they are particularly serviceable when there is much bile in the primæ viæ; in the more advanced stages, the ripe fruits are condemned, but it does not, however, appear, on sufficient grounds, that they should be so; together with the farinacea, a small quantity of animal food may be allowed in the chronic state of the disease, provided it does not disagree with the patient. The drink at the commencement should be either barley or rice water, boiling water poured upon toasted bread or burnt biscuit, whey, or the decoction of hartshorn, and the like; in the advanced stage of the disease, port wine or madeira, or a moderate quantity of spirits diluted with water, will be proper; the patient should wear flannel next to the skin for some time after the disease is gone off, and should take as much exercise as he can bear without fatigue, either on horse-back or in a carriage, carefully avoiding exposure to cold or moisture. The powder or extract of nux vomica is strongly recommended by Dr. Hufeland, in doses of from six to ten grains of the powder, three times a day; or one or two grains of the extract may be given every two or three hours; three or four grains or more may be given in clysters: children of one year old may take from one to two grains of the extract in the twenty-four hours; it is necessary to observe, that the medicine is directed to be administered in some mucilaginous mixture. It is of consequence to warn the young practitioner, in the most forcible manner, against employing opiates at the beginning of the disease, unless a free evacuation of the bowels has been procured by cathartics, and the excitement much diminished, as they generally aggravate the disease; and it will always be pernicious to give them without nauseating doses or emetics, while the griping pains remain; the hyoscyamus, if anodynes are deemed requisite, is preferable to opium, in consequence of its possessing a gently laxative quality.

CLASS II.

Neuroses.

This class of diseases is characterised by an injury of the sense and motion, with an idiopathic pyrexy, or some local affection. It comprises the following orders.

Order I.

Comata.—Stupors implying a diminution of voluntary motion with sleep, or insensibility. Including the following genera. 1. *Apoplexia;* apoplexy, which is either idiopathic or symptomatic, and is described thus: almost all voluntary motion diminished, with sleep more or less profound; the motion of the heart and arteries remaining. 2. *Paralysis;* Palsy, only some of the voluntary motions diminished, frequently with sleep. These also are either idiopathic or symptomatic; the species are asthenic; paralytic; convulsive.

Apoplexy.—The symptoms are so well known that they need not to be repeated. Dr. Baillie remarks very justly that "when the patient is not cut off at once, but lives for some time after the attack, the hemiplegia, which is almost constantly an effect of this disease, is upon the opposite side of the body from that of the brain, in which the effusion of blood has taken place: this, the learned author observes, would seem to shew, that the right side of the body derives its nervous influence from the left side of the brain, and the left side of the body, its nervous influence from the right side of the brain." This disease is observed to make its attacks most frequently about the period of the equinoxes.

The predisposing causes are, a declension from the meridian of life, a large head, a short neck, the sanguine or phlegmatic temperament, obesity,

an indolent life, or one too much devoted to study, too long sleeping, high living, indulgence in spirituous liquors, the gout, and the suppression or cessation of the hæmorrhoidal, or any other habitual hæmorrhage or evacuation. The exciting causes are, violent exercise, as dancing after too great repletion of the stomach, a full and long continued inspiration, too strong exertions of the mind, every passion which agitates the human frame, great external heat, especially from a crowded room, intemperance, warm bathing, crudities in the primæ viæ, violent emetics, the spring season, rapid alternations of heat and cold, too great indulgence in smoking tobacco, long stooping with the head down, tight ligatures about the neck, over distension of the blood vessels of the brain or its membranes, an effusion or extravasation of blood or serum into the substance of the brain or its ventricles, fractures of the scull or depression of it, causing an effusion of blood upon the brain or its meninges, and tumours within the cranium. The proximate cause is supposed to be whatever interrupts the motion of the nervous power from the brain to the muscles of voluntary motion. Difficulty of swallowing, and the regurgitation of the drink through the nostrils, great difficulty of breathing, and foaming at the mouth, are symptoms of the most imminent danger, but the prognosis may be generally collected from the violence of the attack, profoundness of the sleep, stertorous breathing and degree of the affection of the respiration, and of the powers of sense and of motion: the first attack of this disease is not commonly fatal, particularly if the patient is not cut off in the course of the first week, it frequently terminates favourably either by diarrhœa, hæmorrhage, return of the hæmorrhoidal, or any other habitual discharge, and sometimes by the appearance of fever.

Treatment.—As this disease arises in consequence of an effusion of blood or serum into the ventricles of the brain, or upon its meninges, blood-letting in a moderate degree may be of service, but copious bleedings must be injurious, by weakening the patient, and preventing the absorption of the effused fluid; the blood should be taken from the temporal artery, or the jugular vein, and if that cannot conveniently be done, it may be taken from the arm; if one side is more affected than the other, the blood should be taken from the side least affected; cupping the occiput is often serviceable, and it does not reduce the patient's strength so much as general blood-letting; warm fomentations of the shaved head continued for a length of time, and frequently repeated, will be of service; an emetic is recommended to be administered, but, in my opinion, it is at least a doubtful remedy, unless the patient is affected with nausea in consequence of repletion of the stomach; acrid cathartics, as aloes, resin of jalap, calomel combined with the scammony, or with the extract of colocynth, &c. should be given by the mouth, if the power of swallowing remains, and clysters, composed of a solution of some of the above cathartics, and the oleum succini, should be injected; blisters should be applied to the head, spine, and extremities, or a large caustic should be applied to the neck, and mustard cataplasms to the feet: the patient should be kept cool, and as much in an erect posture as he can bear without inconvenience; small electric shocks should be sent through the head; errhines and acrid volatile medicines are recommended, but they appear at least doubtful remedies; if the disease appears to be the consequence of the suppression of the hæmorrhois, leeches should be applied to the hæmorrhoidal veins, fomentations must be employed, and the intestines must be stimulated by means of aloetic cathartics. The strength of the system will be restored by the cinchona, bitters, and chalybeates. The return of this disease is to be prevented by studiously avoiding all the remote causes which are in our power; a plethoric state of the blood-vessels of the brain must be obviated by a low diet, abstinence from fermented or spirituous liquors, moderate exercise, as riding on horseback, if not affected with frequent fits of giddiness, or by walking; costiveness must be prevented by gentle cathartics, and if the disease had arisen from the suppression of the hæmorrhoidal flux, aloetic purgatives will be most suitable; an issue or seton should be made as near as possible to the head, or, as being less disagreeable, a thin slice of the fresh root of the daphne mezereum, steeped in vinegar for twenty-four hours, may be applied daily, and if the inflammation should be very considerable and the discharge profuse, it may be left off for a few days, and the parts should be kept moistened with a solution of sugar of lead.

In *Palsy*, many of the symptoms have a resemblance to those of apoplexy. It will be distinguished from apoplexy, however, by the pulse, which, in this disease, is slow and soft, and by the other symptoms. If it arise from the causes producing apoplexy, it must necessarily be treated in the manner just recommended; when the apoplectic symptoms are removed, and hemiplegia or paralysis only remains, or when it arises from diminished energy of the nervous system, it will be proper to prescribe internal and external stimulants; of the former class are, white mustard seeds, slightly bruised or swallowed whole, in the quantity of a large table-spoonful, three or four times a day, or horse-radish scraped, a table spoonful of which may be swallowed without chewing, night and morning, or they may be combined and made into an infusion, by macerating two ounces of each in a quart of boiling water for four hours, and adding two ounces of the spiritus pimento to the strained liquor, of which two or three ounces may be given three or four times a day; the arnica montana is strongly recommended; the volatile alkali is often of service, and sumach is deserving a trial, from half a grain to three or four grains or more of the dried leaves are directed to be given two or three times a day: of the latter class of stimulants are, blisters, friction of the parts affected with mustard, æther, volatile alkali, linimentum ammoniæ fortius, or the oleum terebinthinæ, combined with the oleum succini and tincture of cantharides; stinging with nettles, and electricity, both sparks and shocks will be of considerable service, particularly if employed early in the disease; flannel must be worn next the skin, warm sea-bathing, and friction with flannel or the flesh-brush, will be useful auxiliaries. If the disease appear to have arisen in consequence of intemperance, the liver will most probably be found to be more or less in a diseased state, which will be known by referring to the diagnostic remarks, in the article Dietetics, in which case, some of the preparations of mercury may be given with much advantage, employing afterwards bitters, bark and chalybeates: the diet should be light, nourishing, and stimulating. The Bath waters are very serviceable, both by the mouth and as a bath, particularly so if the disease has arisen from intem-

perance, or the colica pictonum; should there, however, be a constitutional determination to the head, we must strictly attend to the effects which the Bath waters produce upon the system, as they may suddenly induce much mischief.

ORDER II.

Adynamiæ. Defective powers.—This title is inexplicit, as being equally applicable to a variety of other orders as well as to the present. The order is characterised thus: a diminution of the involuntary motions whether vital or natural.

The genera are, 1. *Syncope*, or fainting; a diminution, or, for a short time, a total stoppage of the motion of the heart. It is either idiopathic or symptomatic. 2. *Dispepsia*, or indigestion. Anorexy, nausea, vomiting, inflation, belching, rumination, heart-burn, pain in the stomach; more or less of these symptoms at least concurring; for the most part with a constipation of the belly, and without any other disease either of the stomach itself or of any other parts. 3. *Hypocondriasis*. Indigestion with languor, sadness, and fear, without any adequate causes, in a melancholy temperament. 4. *Chlorosis*. Green-sickness. Dyspepsy, or a desire of something not used as food; a pale or discoloured complexion; the veins not well filled; a soft tumour of the whole body; debility; palpitation; suppression of menstruation.

It is obvious that the genera of this order relate, for the most part, either to those which belong naturally to the tribe of diseases of indigestion, and have already been treated by us under the article DIETETICS, or else are catenated with peculiar states of the female frame, and as such fall naturally into the article MIDWIFERY, and will be noticed under that term.

ORDER III.

Spasmi. Spasms.—Irregular motions of the muscles or muscular fibres. This definition, however, does not sufficiently distinguish this order from some of the species of *syncope*, which ranges under the last. It is a very numerous family, divided into two sections.

A. In the animal functions. 1. *Tetanus*: a spastic cramp or rigidity of almost the whole body; varying according to the remote cause, as it arises either from something internal, from cold, or from a wound; or according to the part of the body affected, be the cause what it may. 2. *Trismus*; a spastic rigidity of the lower jaw: two species, the first seizing infants: the second, seizing persons of all ages from a wound or cold. 3. *Convulsio*; convulsions, commonly so called. An irregular cronic contraction of the muscles without sleep. Idiopathic, and symptomatic. 4. *Chorea*; St. Vitus's dance: attacking those who have not yet arrived at puberty, most commonly within the tenth and fourteenth year, with convulsive motions for the most part in attempting the voluntary motion of the hands and arms, resembling the gesticulations of mountebanks; in walking, appearing to drag rather than to lift one of the feet after the body. 5. *Raphania*; a spastic contraction of the joints with a convulsive agitation, and most violent periodical pain. 6. *Epilepsia*; epilepsy, a convulsion of the muscles with sleep. From various causes and of various species: cerebral, sympathetic, occasional; as proceeding from injuries of the head; pain; worms; poison; from repulsion of the itch, or an effusion of any other acrid humour; from crudities in the stomach; from passions of the mind; from an immoderate hæmorrhage; or from debility. 7. *Palpitatio*; palpitation. A violent and irregular motion of the heart. 8. *Asthma*; a difficulty of breathing returning by intervals: with a sense of straitness in the breast, and a noisy respiration with hissing. In the beginning of the paroxysm no cough, or the coughing difficult; but the cough free towards the close, frequently with a copious spitting of mucus. Three species; spontaneous; from eruptive fevers; from plethora. 9. *Dyspnœa*; impeded respiration. A continual difficulty of breathing, without any sense of straitness, but rather of fulness and infarction in the breast; a frequent cough throughout the whole coure of the disease. Eight idiopathic species; three symptomatic, accompanying diseases of the heart, a swelling in the abdomen; various maladies. 10. *Pertussis*; hooping cough. A contagious disease; convulsive strangulating cough, reiterated with noisy inspiration; frequent vomiting. 11. *Pyrosis*; water-brash. A burning pain in the epigastrium, with plenty of aqueous humour, for the most part insipid, but sometimes acrid, belched up. 12. *Colica*; colic. Pain of the belly, especially twisting round the navel; vomiting; a constipation. Numerous species, varying according to the nature of the remote cause; and hence proceeding, *a* from metallic poisons; *b* from acids taken inwardly; *c* from cold; *d* from a contusion of the back; *e* from costive habit; *f* from retained meconium. 13. *Cholera*; iliac passion. A vomiting of bilious matter, and frequent excretion of it by stool; anxiety; gripes; spasms in the calves of the legs. Two species: the one arising in a warm season without any manifest cause; the other from acrid matters taken inwardly. 14. *Diarrhœa*; looseness. Frequent stools; the disease not infectious; no primary pyrexy. The species are, crapulous, or from excess of eating; bilious; mucous; cæliac, discharging a chyle-like secretion; lienteric, in which the aliments are discharged with little or no change; atrabiliary. Of these several have been already noticed in the article DIETETICS. 15. *Diabetes*; a chronical profusion of urine, for the most part preternatural, and in immoderate quantity. Two species, D. mellitus, with urine of the smell, colour, and taste of honey. D. insipidus; limpid, but not sweet urine. 16. *Hysteria*; hysterics. Rumbling of the bowels; a sensation as of a globe turning itself in the belly, ascending to the stomach and fauces, and then threatening suffocation; sleep; convulsions; a large flow of limpid urine; the mind involuntarily mutable and fickle. Almost all the varieties of this disease proceed from irregularity in the female sexual organs, and will be found described under the article MIDWIFERY. 17. *Hydrophobia*; a dislike and horror at any kind of drink, as occasioning a convulsion of the pharynx; induced for the most part by the bite of a mad animal. The species are, rabid hydrophobia, from the bite of a mad animal, the desire to bite being propagated; and simple hydrophobia, without madness, or any desire of biting. This genus is equally misnamed, misplaced, and misdescribed.

We can only offer a few observations upon such of this family of diseases as are of most importance from their danger, or frequency of appearance.

Tetanus. Trismus. Locked jaw. The two species denominated by these names are in reality the same disease, varying only in extent. Tetanus sometimes comes on suddenly, more generally, however, a sense of stiffness, or slight twitchings, at first perceived in the neck; these gradually increasing, the motion of the head becomes dif-

ficult and painful; as the rigidity of the neck becomes more considerable, a sense of uneasiness is felt about the root of the tongue, which, by degrees, produces a difficulty or inability of swallowing; there is violent pain under the ensiform cartilage, which shoots to the back; when this pain arises, the muscles, particularly of the back part of the neck, are immediately affected with spasm, pulling the head strongly backwards, at the same time the muscles of the lower jaw become rigidly contracted, so that the teeth are firmly closed together; as the disease advances, the muscles of the whole spine are affected, and draw the body backwards, producing opisthotonos; at other times the muscles of the fore part of the body are affected, and emprosthotonos is the consequence; and when the antagonist muscles of the whole body are so contracted that the patient can bend himself in no direction, but remains as stiff as the trunk of a tree, the disease is called tetanus; which is, however, not so common a form of the disease as the one we are now giving a description of; the abdominal muscles become violently affected with spasm, so that the belly is strongly retracted; at length the whole of the muscles of the head, trunk, and extremities, become strongly affected, and the body is rigidly extended, as above described; the tongue is often partially attacked with spasm, and is often thrust out violently between the teeth; at the height of the disease, every organ of voluntary motion suffers, in a greater or less degree, and in particular the muscles of the face; the forehead is drawn up into furrows, the eyes are hollow, distorted, rigid, and immoveable, the nose is drawn upwards, and the cheeks are drawn backwards towards the ears, so that the whole countenance expresses a most ghastly appearance, and in this state violent convulsions supervene, and put an end to life. The spasms are attended with violent pain, and generally last for a minute or two, and as the disease advances they are often renewed every quarter of an hour, and sometimes terminate in general convulsions; there is seldom any fever, but when the spasms are violent, the pulse is contracted, hurried, and irregular, and the respiration is alike affected, and there is sometimes an interruption of the breathing and convulsive hiccup; in the remissions, the pulse and respiration are natural, the heat of the body is commonly not increased, the face is generally pale, with a cold sweat upon it; the extremities are generally cold, and there is frequently a cold sweat over the whole body; sometimes, however, when the spasms are very frequent and violent, the pulse becomes full and frequent, the face is flushed, and a warm sweat is diffused over the whole body: it is a very remarkable circumstance, that neither the mental nor natural functions are considerably affected; there is seldom delirium, or confusion of thought, the appetite remains good, the urine is sometimes suppressed, or is voided with difficulty and pain, and there is costiveness. It is remarked by Dr. Blane, that the convulsive twitchings are sometimes accompanied with pleasure.

This disease often proves fatal before the fourth day; after that period there is generally less danger, but, although there may be some abatement of its violence, it is apt to return with renovated force; a favourable termination of it is sometimes attended with a sensation of stupor, or formicatio, and a sense of itching, more frequently, however, it goes off, without any evident crisis; the danger will, therefore, be determined by the violence of the attack, and frequent recurrence of the spasms, and general convulsions.

The removal of this disease must be attempted by administering opium in moderate but frequent doses, and where the deglutition is performed with any difficulty, it should be thrown in by clyster; wine is a most valuable auxiliary, but it should be taken in large quantities, and it will be more serviceable when given in combination with opium; the cinchona is recommended, but it does not appear to have answered the sanguine expectations that were to be wished for; mercury is often of service, provided it is pushed so far as to affect the mouth; the warm bath, or a bath composed of milk or oil, has been recommended, and has sometimes succeeded, when employed in combination with opium, the heat of the bath is ordered to be lowered or raised, so as to afford the sensation of gentle and comfortable warmth; the most powerful remedy, however, appears to be immersion in the cold bath, in the paroxysm of convulsion, taking care to have some warm blankets in readiness, and immediately the patient is taken out of the bath he should be well rubbed with warm flannels, and put to bed; opiate frictions are particularly recommended, as the medicine can, in this way, be introduced into the system more readily, and without increasing the frequency of the spasms, which frequently occur during the efforts of deglutition; the combination of opium with æther is also of great service; the diet should consist of milk and broths, and if the nourishment cannot be received by the mouth, it should be thrown up by clyster. If the disease has arisen in consequence of the partial division of a nerve, it should be cut through, and if from a wound, it should be dilated, and filled with stimulating applications, as lint, moistened with the oleum terebinthinæ, and we must avoid exposure of the part to a current of cold air: the pain under the ensiform cartilage, and the spasms in general, will most commonly be relieved by applying cloths dipped in æther, and by gentle and uniform pressure on the parts suffering from spasm, by means of bandages, on which the æther should be poured occasionally, guarding, however, against the cold produced by the too speedy evaporation of the æther. The trismus of infants is a disease most frequent in warm climates; it generally attacks infants, within the first fortnight after birth, more frequently, however, before they are nine days old; as it, in our opinion, very frequently proceeds from a retension of the meconium in the primæ viæ, it will be highly proper, in the first instance, to exhibit gentle laxatives, afterwards wine and antispasmodics, and if we do not succeed by these means, it will be advisable to try the cold bath, and the remedies above recommended.

Epilepsy may be distinguished from other species of convulsions by the sopor, and by the abolition of the sensation of external impressions; from apoplexy, by the increased action of the muscles; from hysteria, by the absence of the globus hystericus, and by its not being attended with the fear of death. The symptomatic epilepsy is more easily cured than the idiopathic; the later in life epileptic fits are experienced, the more dangerous they may, in general, be esteemed, as the cause may be supposed to have been acquired by the patient's habits of life, or by the decay of some internal part: hereditary epilepsy is scarcely ever cured; the longer the continuance of the complaint has been, and the more violent and frequent the convulsions are, the more dangerous is the disease, particularly if the vital functions are much affected; sometimes, although not very fre-

quently, a single violent paroxysm cuts off the patient: epilepsy sometimes goes off at the age of puberty, or on the appearance of the menses; an intermittent fever, or a cutaneous eruption, often removes the disease.

Treatment.—Blood-letting will sometimes be of service in the paroxysm, if the disease has not been of long continuance, and the patient is in a plethoric state; in general, however, it is more advisable not to take away blood, but to trust to less debilitating remedies: immediately the patient is attacked with a fit, we must endeavour, as far as possible, to prevent his receiving any injury from the violent agitation of his body; he ought, therefore, to be put into a bed, with his head raised, and to have any pressure, occasioned by ligatures about his neck, instantly removed; stimulants should be applied to the nostrils, as errhines, or volatiles, as the spiritus ammoniæ compositus, the spiritus ammoniæ succinatus, &c. and the spine should be rubbed with the æther, or with the linimentum ammoniæ fortius, or oil of turpentine, and they will be more serviceable, if combined with stimulants, as the oil of amber, or the tincture of cantharides; it will be proper to administer opiates, and other antispasmodics, by clyster, particularly musk, and valerian. In the intermissions we are to attempt the radical cure of the disease; when the disease is symptomatic of some primary affection, we must, by a particular attention to the attending symptoms, endeavour to discover the nature of that affection; and if we succeed in removing the primary affection, by the proper means adapted to its cause, the epileptic attacks will cease of course; the aura epileptica has been removed by a tight bandage being made round the limb, just above the part from which that sensation appears to proceed; we must direct the patient to carefully avoid the occasional causes which are within his reach, and the predisposition must be corrected, as far as lies in our power. When the disease is idiopathic, and appears to depend upon a plethoric state of the system, that must be removed or prevented by moderate exercise, an abstemious diet, and issues, or setons: if the disease appear to arise from any suppressed discharge, in particular the hæmorrhois, leeches should be applied to the hæmorrhoidal vessels, fomentations should be employed, and we should, at the same time, administer aloetic cathartics; after the plethoric state of the system is removed, the cure of the disease will be effected by antispasmodics: when the disease seems to arise in consequence of a debilitated state of the system, it must be strengthened by cold-bathing, exercise, change of air, a nourishing diet, tonics, and antispasmodics; the most suitable tonics are bark, oxyd of arsenic, ammoniate of copper, sulphat of copper, oxyd of zinc, and chalybeates: the antispasmodics in most general use are, oil of cajeput (melaleuca leucadendron), æther, musk, digitalis, stramonium, belladonna or hyoscyamus, lunar caustic, and opium, which last is most assuredly the best and most efficacious antispasmodic; it should be administered in doses, proportioned to the age and constitution of the patient, a short time before the expected return of the paroxysm; the opium must be repeated at proper intervals, and it will be necessary to increase the dose in a gradual manner, in proportion to the violence or frequent recurrence of the fits: whatever antispasmodic is employed, it will be indispensably requisite never to allow its effects to cease on the system, and to continue its use for months, or even a year or two after the violence of the disease is overcome, and the fits have ceased, in order to establish a new habit in the system, and it should on no account be left off all at once, but the dose should be gradually diminished, as the fits are very apt to return, on the discontinuance of the medicine, with increased violence and danger: it will not be improper to remark, that antispasmodics are employed with most advantage, a short time previous to the expected recurrence of the paroxysm, and when the fits recur during sleep, a full dose of an opiate should be given at bed-time; the application of a cataplasm, formed chiefly of tobacco, to the scrobiculus cordis, about half an hour before the expected return of the paroxysm, has sometimes prevented it, and this practice, repeated several successive days, at the expected periods, has destroyed the diseased catenation, and effected a permanent cure: if the disease appears to arise from sympathy, some instrument of terror should be kept in readiness, as the actual cautery, or something that will inspire horror, which will very frequently prevent the fits: should derangement of the primæ viæ, worms, dentition, or any other obvious exciting cause, be the means of occasioning the disease, it must be removed by laxatives, and other remedies adapted to its causes, and as the disease so frequently, in part, arises from the first mentioned cause, occasional emetics and gentle cathartics will be proper, in order to obviate any accumulation of irritating matter in the stomach and intestines: when the disease proves obstinate, especially in those who are advanced in life, or have been intemperate in the use of fermented, spirituous, or distilled liquors, we have every reason to suspect some derangement in the hepatic system; in which case it will be requisite to employ the hydrargyrus, to a greater or less extent, in proportion to its effects on the disease, and it will, if the patient is not in a very debilitated state, sometimes be of essential service to push the mercury so far as to affect the mouth. A total change of habit and climate may also frequently be prescribed with great benefit.

Asthma.—The paroxysms of this disease very frequently commence during or after the first sleep, with a sense of tightness and stricture across the chest, and a feeling of uneasy oppression in the lungs, impeding respiration; there is either no cough present, or it is not attended with any expectoration: the patient, if in a horizontal situation, is immediately under the necessity of getting into an erect posture, and of flying for relief to the open window; the difficulty of breathing for a time increases, and both inspiration and expiration are attended with a wheezing noise, the voice is weak, and the exertion of talking is more or less painful: after these symptoms have continued for some hours, a profuse sweat sometimes breaks out, the breathing becomes less laborious, and the cough, which, at the commencement, was not present, or was without any expectoration, now becomes more free, and a more or less copious secretion of mucus takes place, and the other symptoms abate, but there is a greater or less degree of tightness across the chest, and of difficulty of breathing, throughout the course of the day; towards evening, or about midnight, for several successive nights, the symptoms suffer an exacerbation, and a remission takes place towards morning; and after some days, on the expectoration becoming and continuing more copious, the paroxysms for a time cease altogether: the pulse is,

for the most part, quick, weak, and small, and the urine, which, at the commencement of the paroxysm, was pale, on its remission becomes high-coloured, and often deposits a sediment; the face is sometimes, during the paroxysm, somewhat flushed and turgid, more commonly, however, it is pale and shrunk: asthma is very frequently an hereditary disease; it does not very commonly appear before the time of puberty, and chiefly affects the male sex; it is most liable to return in hot weather, this, however, is not always the case: the paroxysm is often preceded by lassitude, torpor, drowsiness, a sense of weight or pain of the head, and symptoms of dyspepsia.

Treatment.—In the paroxysm, if the patient is young, and of a plethoric habit, blood-letting will be often of service, especially if employed in the early periods of the disease, but if it has been of long continuance, it is generally hurtful, but cupping between the shoulders is often of considerable service; gentle laxatives and clysters should be employed, at proper intervals, so as to keep the bowels regular; gentle emetics should on no account be dispensed with, and where a paroxysm is expected to occur in the course of the night, an emetic, exhibited in the evening, will generally prevent it: antispasmodics should be administered, as opium, asa-fœtida, æther, &c.; it will be necessary to assist and promote the expectoration by means of some of the following remedies, either alone, or perhaps a more preferable manner will be in combination, as milk of ammoniac or of asa-fœtida, the decoction of seneka, or a solution of spermaceti, with nauseating doses of tartar emetic, or with some of the preparations of squills; the carbonat of ammonia, and myrrh, are also medicines of considerable efficacy; but squills are, by far, the most valuable expectorant of any in the whole materia medica; a blister should be applied to the chest, the vapour of warm water should be inhaled, and its effects will be increased, if the water is impregnated with æther; warm pediluvia, or the warm bath should be ordered; the respiration of an atmosphere, mixed with hydrogen gass, or any other innocuous air, which might dilute the oxygenous gass, would be useful in spasmodic asthma, by decreasing the sensibility of the system, and preventing the recurrence of the paroxysms; the respiration of an atmosphere, with an increased proportion of oxygen, is recommended in what is called the humoral asthma: in the intermissions, the remote causes should, as far as lies in our power, be carefully avoided; the use of fermented liquors, and particularly of distilled spirits, must be strictly inhibited; the diet should be light, of easy digestion, not flatulent, and the food should be taken in moderate quantities, taking care not to oppress the stomach; but when the disease has been of long continuance, a more full diet may be allowed; riding on horseback, or in a carriage, and more particularly a sea-voyage, should, if convenient, be advised, or the patient should change the air, and try different situations, until, either by accident or by perseverance, he finds out a situation to live in, in which the disease is rendered less distressing, or is entirely removed; repeated blisters should be applied about the chest, or an issue be made in the neighbourhood: smoking tobacco is useful; and garlic or onions by way of sauce may be also found serviceable. Bark, chalybeates, and aloes, should be had recourse to towards the close of the paroxysm.

Colic commences with an acute pain over the abdomen; the navel is twisted towards the spine; and the muscles of the abdomen are spasmodically contracted into separate portions, giving it the appearance of a bag full of round balls; there is vomiting of a bilious matter, obstinate costiveness, and generally coldness of the extremities; the urine is high-coloured, is voided in small quantity, and with some degree of difficulty and pain: the disease is seldom attended with pyrexia; in the first instance, sometimes, however, an inflammation of that part of the intestine, where the disease is situated, supervenes, and aggravates the disease: when the peristaltic motion of the whole intestinal canal is inverted, the disease is called ileus, which is only to be regarded as a more violent degree of colic; it is, however, more apt to terminate in enteritis, or gangrene.

The *removal* of this disease will generally be effected by blood-letting, in the repetition of which we must be guided by the state of the pulse, violence of the attack, and strength of the patient; in all violent attacks of colic, if the patient is in tolerable vigour, it will not only be advisable but prudent to take away a moderate quantity of blood (except the disease arises in consequence of lead being received into the system), more particularly so, if the pulse is full or hard, and there are any symptoms denoting a tendency to enteritis, it will, at the same time, be the means of relaxing the spasm, and procuring stools: the warm bath should be ordered, or the abdomen should be fomented, and strong peppers and spirits may be added to the fomentations; friction of the abdomen with warm oil, or bags filled with hot sand, or bladders filled with hot water, may be employed also with great advantage; blisters or rubefacients, together with warm pediluvia, will be requisite; antispasmodics should be administered internally, and where the disease has not been preceded by long costiveness, opium will be the most efficacious remedy, especially if vomiting prevents the exhibition of cathartics: where, however, the disease has been preceded by costiveness, the hyoscyamus will be found to be a more suitable remedy, as along with its narcotic, it also possesses a gently cathartic quality: cathartics must be ordered, and they will be more efficacious when given in combination; calomel, above all, ought never to be given alone; its operation is always rendered more certain and easy by combining it with other cathartics, and the addition of a few drops of some essential oil will, in a great measure, obviate their griping effects; laxative clysters must be ordered; at first they should be mild, and tolerably large; the addition of a portion of oil, or of a solution of Epsom salts, will be an useful auxiliary. And if we do not succeed in procuring the evacuation of the intestines by the above means, we must have recourse to the injection of the smoke of tobacco, or a more certain and efficacious remedy is a decoction of tobacco, in the proportion of half a drachm to four ounces of water, to be thrown up as an enema; if all the above means prove of no avail, we must have recourse to mechanical dilatation, as, by administering one or two ounces of the hydrargyrus every hour or two, or a large quantity of warm water should be injected by means of a large syringe: when every purgative, and even all other means that are in most common use, have failed, the action of the intestines has sometimes been effectually excited by throwing cold water on the lower extremities.

The *Colica Pictonum* vel Saturnina, or Colic from Lead, differs from the species above described, in not coming on in so sudden and violent a manner, and also in its cause, that of lead taken into the

body, under various circumstances, as by exposure to the action of it, or by drinking cyder, or other liquors impregnated with it; the disease generally commences with slight uneasiness in the bowels, or with a sense of weight, or of an aching, rather than an acute pain, about the navel, which is increased after eating; the pain remits, and is sometimes relieved by pressure upon the abdomen; this, however, is frequently not the case; after a time the pain increases, becomes permanent, and intolerably excruciating; there is retraction of the umbilicus, the integuments of the abdomen and the intestines are violently contracted, and drawn towards the spine, and the spasms are often so obstinate that it is with the greatest difficulty a clyster can be thrown into the rectum; the pulse is hard and tense, there is obstinate costiveness, and often strangury; after several attacks paralysis comes on, chiefly of the upper extremities, although there are numerous cases recorded, in which the lower are affected also, and sometimes it terminates in swellings of the joints, and loss of sight; sometimes, but more rarely, the disease is succeeded by paralysis after the first attack; the patients cannot rest in bed for the violence of the disease, and they find relief in walking about, if they have sufficient strength; those who have once laboured under the disease, are very liable to relapse, in which case the disease comes on in a more violent manner than before, and the recovery is then more slow, and less complete. In the removal of this violent disease we must, in the first place, restore the intestines to their natural irritability, by the exhibition of a large dose of opium; we should then administer some cathartic medicine at proper intervals, as the sulphas magnesiæ vel sodæ, or the phosphas sodæ, dissolved in broth, or some aromatic fluid, castor or almond, may be given, combined with tincture of senna; and if the stomach is in a very irritable state, the medicines must be exhibited in the form of pills, for which purpose the calomel, joined with extract of jalap or colocynth, and a few drops of some essential oil, will be the most suitable; laxative clysters will be necessary, to which may be added some cathartic salt, or oil; the pain of the abdomen will be relieved by rubbing it with tepid oil, or by applying spiced fomentations, or by the warm bath, or by bags of hot sand, and similar antispasmodics; the application of a large blister to the abdomen is, however, a much more efficacious remedy; when we have relieved the urgent symptoms, the disease will, on its first attacks, be effectually removed by employing mercury internally and externally; mercury must be pushed so far as to occasion some affection of the mouth as soon as possible, and the system must be kept under the influence of mercury, in a greater or less degree, according to the violence of the disease, for two or three weeks after every symptom of the disease has disappeared, as it is very apt to return, and with increased force: as a disposition to costiveness often remains, it should be obviated by some of the above cathartics: it sometimes happens that the pain in the bowels shifts suddenly, and attacks the head, causing extreme misery; in this case nothing affords so much relief as blisters applied to the back, behind the ears, and to the temples, successively, according to the urgency or continuance of the pain; opiates may be administered at the same time with advantage. The paralytic affections, which are the consequence of this disease, and the ileus, will be removed by the internal and external employment of Bath waters.

In *Diabetes* the most prominent symptoms, according to Dr. Rollo, are voraciousness and keenness of appetite, or a frequent craving for food, without the feel of entire satiation; a parched mouth, with constant spitting of a thick viscid phlegm, of a mawkish, sweetish or bitterish taste; intense thirst; a whitish tongue, with red bright sides; red and swelled gums, with the teeth feeling as on edge from acids, and loose in their sockets; headach; a dry hot skin, with flushing of the face; a pulse most generally about eighty-four or six; an increase of clear urine, of a light straw colour, having a sweetish taste, resembling sugar, or rather honey and water; an uneasiness of the stomach and kidnies; a wasting of the flesh; a weariness and disinclination to motion or exertion, with the feeling of weakness; an excoriation, with soreness of the glans penis and prepuce, which is sometimes swelled, and there is no desire of venery; in females there is a peculiar uneasiness about the meatus urinarius.

The predisposing *causes* of this disease are at present obscure, but the disease has been found to occur in those who have indulged in fruit, sweatmeats, pickles, high-seasoned food, warm stimulating condiments, wine and fermented liquors, or indulgence even in the farinacea, with large quantities of small beer, accompanied by great bodily exercise, with or without active mental employment; moisture, grief, vexation or agitation of mind; sudden variations of temperature may also be regarded as predisposing or exciting causes. The proximate cause is supposed to be a morbidly increased action of the stomach, with consequent secretion, and vitiation of the gastric fluid, marked by an eagerness of appetite and acidity; the direct effects of which are the formation or evolution of saccharine matter, with a certain defect of assimilation, preventing the healthy combinations, and exciting the immediate separation of the imperfectly formed chyle by the kidnies. Dr. Baillie thinks it probable that diabetes depends, in a considerable degree, upon a deranged action of the secretory structure of the kidnies, by which the blood there is disposed to new combinations; the effect of these combinations is the production of a saccharine matter; he further thinks it probable, at the same time, that the chyle may be so imperfectly formed, as to make the blood be more readily changed into a saccharine substance, by the action of the kidnies: an opinion well worth minute enquiry.

The cure of this disease consists in confinement, an entire abstinence from every species of vegetable matter, a diet solely of animal food, and that in as small quantities as the stomach will be satisfied with; emetics, hepatised ammonia and narcotics, will be necessary, and they should be assisted by the daily use of alkalies and lime water: the hepatised ammonia should at first be exhibited in doses of five or six drops, three or four times a day; the dose is to be gradually increased, so as to produce some degree of nausea, or slight giddiness; it should not be mixed up in draughts, or in any other form, as it is readily decomposed, but it should be dropt from the phial, at the time of using it, into a proper vehicle, and taken immediately; distilled water is the best vehicle; an opiate should be administered at bed time, with from twenty to thirty drops of the vinum tartritis antimonii; this plan is to be pursued, until the morbid condition of the stomach is removed, the marks of which are, a scarcity and high-coloured state of the urine with turbidness, furnishing on evaporation an offensively-

smelling and saltish-tasted residuum without tenacity, accompanied with a want of appetite, and loathing of food; at this time the tongue and gums will be found to have lost their florid red colour, and to have become pallid; when this state occurs, exercise is to be enjoined, and a gradual return to the use of bread is to be allowed, and vegetables, such as brocoli, spinage, peas, cauliflower, cabbage, lettuce, and parsnip, in moderate quantity; these last have been observed to have been eaten with impunity: the drink should consist of such liquors as afford the least saccharine matter, as weak brandy or rum and water, with the occasional use of bitters; costiveness must be obviated by gentle laxatives, as flower of sulphur, oil of castor, or aloetics, combined with soap; the exciting and keeping up a degree of nausea, with proper doses of tartar emetic, is recommended in the early stages of the disease; the camphor and other narcotics, besides opium, are deserving of a trial; alum whey, which is made by boiling a drachm of the alum in a pint of milk, is said to considerably reduce the quantity of urine; nut-galls and lime-water have been employed with success.

Order IV.

Vesaniæ. Intellectual derangements.—Disorders of the judgment without pyrexy or coma. The following are the genera. 1. Amentia: an imbecility of judgment, by which people either do not perceive or do not remember the relations of things; the species are connate, from old age, from evident external causes. 2. Melancholia: a partial madness, without dyspepsy or indigestion: varying according to the different subjects concerning which the person raves; and hence admitting an almost infinite multiplicity of varieties. 3. Mania: universal madness. Idiopathic and symptomatic: under the former section mental, and corporeal, or arising from some evident disease of the body: under the latter proceeding from poisons, from passion, from febrile affection, and hence rather referable to the corporeal species. 4. Oneirodynia: a violent and troublesome imagination in time of sleep. Two species: O. activa, somnambulism or sleep-walking; and O. gravans, night-mare.

To *Mania*, with which *Melancholia* is so nearly allied, we shall devote an observation or two.

Mania often arises from intense study, violent emotions of the mind, unrestrained passions, long exposure to the scorching rays of the sun, overstraining the faculties of the mind, intemperance, organic affections of the cranium, an hereditary disposition, sanguine temperament, long-continued melancholy, suppressed evacuations, repelled eruptions, and religious enthusiasm. The proximate cause is supposed to consist in an increased excitement of the brain. It is distinguished from phrenitis by the absence of the pyrexia and head-ache, and from delirium by the state of the pulse, by the patient not knowing the place where he is, nor the persons of his friends or attendants, and from not being conscious of external objects, except when roused, and even then he soon relapses into a state of inattention; whereas in mania, he is frequently sensible, and is continually planning the means of preventing or revenging supposed injuries, and frequently the resentment is directed against his dearest friends.

Treatment.—According to Dr. Darwin, the circumstances which render confinement necessary are, the lunatic being liable to injure others, or himself, or not being able to take care of his own affairs; and if none of these circumstances exist, there should be no confinement; for he remarks, though the mistaken idea continues to exist, yet if no actions are produced in consequence, the patient cannot be called insane, but only delirious; and he adds, that if every one who possesses mistaken ideas, or who puts false estimates on things, was liable to confinement, he does not know who of his readers might not tremble at the sight of a madhouse: it will, however, in the first instance, always be proper to gain a complete ascendancy over the patient, either by gentle or coercive measures; his anger and violent passions must be restrained by the strait waistcoat; he should be kept in silence and darkness, and, as much as possible, in an erect posture; none of his intimate acquaintances or friends should be allowed to visit him. At the commencement of this disease blood-letting may be employed with advantage, the blood should be taken from a large orifice in such quantity as to induce some tendency to deliquium animi; when the temporal artery, or jugular vein, can be conveniently opened, it should be preferred; if the disease have been of considerable duration, bleeding will not be advisable; a solution of the gum ammoniacum, with the Glauber's salts, should be given daily, so as to keep the bowels pretty laxative; the head should be shaved, and cloths, moistened with the coldest water, pounded ice, or water artificially rendered so, should be gently wrung, and applied constantly to the head; they should be renewed as soon as they acquired any heat, until a sense of cold and chilliness are induced, when they are to be left off, and had recourse to again when necessary, or the affusion of cold water upon the head may be substituted, it should be poured from a considerable height; it is recommended to put the patient into the warm bath up to his shoulders, and then to pour cold water upon the head, previously shaved: vomits, consisting of from five to ten grains of the tartris antimonii, are recommended to be given every three or four days, for two or three weeks; opium and camphor have been employed in large doses, and frequently with advantage; the digitalis has been found particularly serviceable, it should be exhibited in gradually repeated doses, and continued until a degree of sickness is induced, or till the frequency of the pulse suffers a considerable diminution, it must then be left off, and again renewed when its effects on the constitution begin to wear off; the gratiola has been recommended in doses of ten grains, two or three times a day; hard labour, and long-continued journeys have, in some instances, effected a cure: it is proper to remark, that the pulse in mania is sometimes full and strong; when this occurs, evacuations and diluents will be necessary; at other times the pulse is quick and weak, in this case a more nourishing diet, bark, chalybeates, and small doses of opium, will be proper; in general the patient should be allowed only a low and spare diet; blistering has not been found of service, except at the commencement of the disease; the affusion of warm water on the surface of the body, that is, water of the temperature of the blood and upwards, is often employed with soothing effects. The cold bath is strongly recommended in the height of the paroxysm, except the digestion is much impaired, or the vigour of the circulation is much debilitated, the patient should be thrown in headlong, and as he comes out he should be thrown in again, until he becomes calm and rational, or very much debilitated: though in mania the temperature of the body is little or not at all increased, maniacs retain the actual heat with great tenacity, and under the above restrictions, the cold bath may

often be applied with advantage, and always with safety: after the disease is removed, it will be proper to administer bark, chalybeates, the oxyd or sulphat of zinc, and the sulphuric acid.

CLASS III.

Cachexiæ. Depraved habits.

A depraved habit of the whole or greatest part of the body, without primary pyrexy or neurosis. The following are the orders of this class.

ORDER I.

Marcores. Declines.—This order includes the following genera: 1. Tabes. Leanness, debility, hectic pyrexy. Three species; purulent, scrophulous, and from poison taken internally. 2. Atrophia; differing from tabes in being without hectic pyrexy. The species are from too great evacuation: from a deficiency of nourishment: from corrupted nourishment: from decay of the nutritive organs.

In tabes and atrophy the cure may best be effected by the removal of the remote causes, or the idiopathic diseases on which they depend; the tabes mesenterica, which is sometimes an idiopathic disease, in which there is great debility, emaciation, and paleness; there is at the same time enlargement of the head and abdomen: it will be effectually removed by small doses of the calomelas, or of the murias hydrargyri; the doses must not be so large as to excite catharsis; the hydrargyrus is intended only to act as an alterative; the solutio muriatis calcis is deserving of an unbiassed trial; the cure will be accelerated if we, at the same time, employ chalybeates, combined with a neutral salt, with fossile alkali, or with rhubarb, in such doses as to act moderately upon the bowels; the employment of a tepid salt-water bath, or washing the patient with a solution of salt, night and morning, will also be of service.

ORDER II.

Intumescentiæ. Morbid swellings.—An external tumour of the whole or greatest part of the body. These are adipose, flatulent, or aqueous, forming three distinct sections. Of the first is, 1. Polysarcia. Corpulency. Of the second are, 2. Pneumatosis: a tense elastic swelling of the body, crackling under the hand. 3. Tympanites: a tense, elastic, sonorous swelling of the abdomen; costiveness; a decay of the other parts. Two species; intestinal, and abdominal. 4. Physometra: a slight elastic swelling in the epigastrium, having the figure and situation of the uterus. Under the third section we have, 5. Anasarca; a soft inelastic swelling of the whole body or some part of it; arising from a multitude of causes, and hence admitting of a multitude of species. 6. Hydrocephalus. A soft inelastic swelling of the head, with the sutures of the cranium opened. 7. Hydrorachitis. A soft slender tumour above the vertebræ of the loins; the vertebræ gaping from each other; formerly denominated spina bifida. 8. Hydrothorax. Dropsy of the chest. Dyspnœa, paleness of the face; oedematous swellings of the feet; scanty urine; lying down difficult; a sudden and spontaneous waking out of sleep, with palpitation; water fluctuating in the chest. 9. Ascites. A tense, scarcely elastic, but fluctuating swelling of the abdomen. Two species: one A. abdominalis, extending over the whole abdomen with an equality of tumour, and a fluctuation sufficiently evident, arising from an obstruction of the viscera, from debility, or from thinness of the blood; the other, A. saccatus, confined in a bag, the swelling more partial, and the fluctuation less evident. 10. Hydrometra. Dropsy of the womb. A swelling of the female epigastrium gradually increasing, preserving the shape of the uterus; yielding to pressure, and fluctuating; without ischury or pregnancy. 11. Hydrocele. Swelling of the scrotum, not painful, increasing by degrees, soft, fluctuating, and pellucid. 12. Physconia. A swelling chiefly occupying a certain part of the abdomen, and neither sonorous nor fluctuating. These species are very numerous, and named from the part the disease occupies, whence we have physconias, hepatic, splenic, renal uterine, &c. 13. Rachitis. Rickets A large head, swelling most in the fore part, the ribs depressed; abdomen swelled, with a decay of the other parts. It varies merely in being simple or conjoined with other diseases.

From this list it will appear obvious, that a preternatural collection of serous or watery fluids is often formed in different parts of the body; and although the disease arising from it is distinguished by different names, according to the various parts occupied, yet those collections all come under the general appellation of dropsy. When water is diffused through a part, or the whole, of the cellular membrane, the disease is called anasarca; when there is a collection of water within the cavity of the cranium, it is named hydrocephalus internus; when upon the vertebræ of the loins, it is called hydrorachitis; when within the cavity of the thorax, it is named hydrothorax; when it is contained within the cavity of the abdomen, it is called ascites; when in the uterus, hydrometra; and when it is collected within the scrotum, it has the appellation of hydrocele. We can only notice a few of these.

The removal of *anasarca* must be attempted by removing the remote causes, which still continue to act, by evacuating the collected fluid, and by restoring the strength of the system. The remote causes are often such as have been removed before the disease occurs, although their effects continue; for the most part, those causes are certain diseases or habits, previous to the occurrence of the disease, which are to be cured by proper remedies, adapted to their causes, and by desisting in particular from indulgence in the use of ardent spirits, when the origin of the disease can be traced from that source; the collected fluid must be drawn off by scarifications, the punctures of which must be made small, and at some distance from one another, as there is a tendency in wounds, made in dropsical cases, to become gangrenous; issues, or the daily application of a thin slice of mezereum, steeped in vinegar, will be proper, they should be made a little below the knees; colewort leaves should be applied to the feet and legs, which must be removed occasionally as they become imbued with moisture, or bootkins should be made of oiled silk, and bandages should be applied to the lower extremities; emetics are also very serviceable, they should consist of ipecacuanha, tartar emetic, or squills, with a few grains of the sulphat of copper; the most powerful remedies, however, are cathartics, which dropsical patients in general bear more easily than emetics; those in most general use are, gamboge, jalap, colocynth, scammony, calomel, and elaterium; this last should be exhibited in the form of a pill, or given in diluted spirits, in doses of half a grain or more, every hour, until vomiting or catharsis is excited; but the most powerful remedy is the crystals of tartar, which should be administered in doses of two drachms

every hour, till copious evacuations are procured either by stool or urine, giving at the same time tepid liquids plentifully; this medicine should be repeated every, or every other morning, according to the strength of the patient; as the thirst is a very distressing symptom in this disease, the patient should be allowed to take as much water, or mild mucilaginous liquids, acidulated with the crystals of tartar, as he feels disposed for; bottled cyder, drank in considerable quantities, is sometimes of service; diuretics must be administered, and they should be combined with tonics and aromatics, or with essential oils; the most powerful medicine of this class, however, is the digitalis, and it is most efficacious when joined with some of the above diuretics: it should be given in such doses as to affect the state of the pulse, and if it does not speedily afterwards act as a diuretic, it will be of little avail to persevere in its exhibition; as the perspiration is often greatly diminished, diaphoretics have sometimes been employed with advantage, or opiates combined with ipecacuanha, and the action of the vessels upon the surface will be excited by friction, particularly in the morning, and it will be more serviceable if made from below upwards; if the above methods should be of no avail we must try mercury, and it should be pushed so far as to affect the mouth, and its effects on the system must not be allowed to cease until the swelling subsides. The debility of the system will be removed by studiously avoiding all the remote causes in our power, by gentle exercise, by supporting the integuments of the lower extremities by means of bandages properly applied, as a well-constructed laced stocking, and by the employment of bark, quassia, sulphuric acid, and chalybeates, and they will be more efficacious when combined with diuretics; the vapour bath has been employed with considerable advantage, especially when assisted by frictions; if the disease arises in consequenee of obstructions of the viscera, or siphilis, some of the preparations of mercury will be necessary, employing at the same time chalybeates and tonics. The pulse has been sometimes, although rarely, found full, hard, and tense, in which case blood-letting is advisable.

Hydrocephalus generally attacks children, and very often comes on in a very gradual manner; one of the earliest criterions is the patient being uneasy on raising his head from the pillow, and wishing to lie down again immediately; it frequently commences with languor, pains in the limbs, and head-ach; the patient is affected with nausea and vomiting several times in the course of the day, the pain of the head is usually confined to one side, or extends from just above the eye-brows to the temples; sometimes, however, it is universal over the whole of the head; the head-ach frequently alternates with the affection of the stomach, and the head is now and then observed to lean more to one than the other side; the eyes are painfully sensible to the light, there is moaning and watchfulness, or, if the patient sleeps, he grinds his teeth, picks his nose, and often awakes suddenly in a fright; the bowels are costive, and are with difficulty acted upon by the strongest purgatives; the pulse is more frequent than in health, but regular; these symptoms go on increasing, the pupils become dilated, and the axes of the eyes are turned in different directions; the vomiting and pain of the head become more distressing, there is some difficulty of breathing, the heat of the body, and of the head in particular, is increased, pyrexy comes on, of which there are perfect intermissions many times in the course of the day, with an evident exacerbation in the evening; the countenance is occasionally flushed, and the pulse, from being frequent, now becomes slow and irregular: as the disease advances the pain of the head somewhat abates, and a degree of stupor or coma succeeds the watchfulness of the former stage, and if they are roused, they are fretful, and often utter dissonant and loud screams, the hands are often lifted up to the head, and the strabismus becomes more considerable, the pupils are more dilated, and scarcely contract when exposed to a strong light, sometimes there is a total defect of vision; they swallow liquids with unwillingness and some apparent difficulty; the vomiting now ceases, the disposition to costiveness continues; now and then, however, dark stools are evacuated, in which worms are frequently observed; when the disease has continued in this state for a few days, the pulse again becomes regular and frequent, but very weak; the breath is drawn with difficulty, and with a stertorous noise, the patient is frequently affected with loud shriekings, red spots appear on different parts of the body, particularly about the joints, and at length convulsions come on, and close the scene.

As hydrocephalus frequently runs rapidly to its fatal termination, we must employ the most active remedies in the first stage; the most powerful remedy, at the commencement of this deplorable disease, is blood-letting: in children it will be sufficient to apply leeches to the temples at proper intervals; in adults we may, with great propriety, employ general blood-letting, in general, however, local blood-letting will be most serviceable; costiveness must be obviated by the more active cathartics, as the calomel combined with the gamboge, scammony or elaterium, and by the employment of clysters; the head should be shaved, and a large blister applied over the whole of it, or between the shoulders; it will be proper to keep up the discharge occasioned by the blister for some time, in which case an alternation of them from the head to the back, or behind the ears, will be attended with more beneficial effects than a perpetual blister; the velocity of the circulation will be diminished by the exhibition of the digitalis, and if we have reason to conclude that an effusion has taken place, the absorption of the fluid will be promoted by combining the digitalis with calomel; the latter must, however, be administered at proper intervals, in such doses as will produce some affection of the mouth; opiates should be given at the same time, and if the patient is very much debilitated, it will be proper to exhibit bark and chalybeates; errhines may be tried, as one grain of turbeth mineral, mixed with from ten to fifteen grains of sugar or liquorice powder; this should be gradually blown up the nostrils: frequent electric shocks, from very small charges, are recommended to be passed through the head in all directions; the hydrocephalus is sometimes symptomatic of worms, disorders of the bowels, or mesenteric affection; when this is the case, the disease will generally be removed in a short time by the employment of mercurial cathartics, combined with other active purgatives, by blisters, and by some of the preparations of iron.

Rachitis.—This disease seldom makes its appearance before the eighth or ninth month, or after the second year of the child's age; it appears first with a flaccidity of the muscles, and falling away of the flesh, although the food is taken in in large quantities; if the child is able to walk, a difficulty of breathing, and palpitation of the heart, will be

perceived on its walking a little faster than usual; the face is pale, and somewhat bloated, and the child becomes daily more averse to exercise or motion; the head appears large in respect to the body, and the forehead becomes unusually prominent; the fontanelle and sutures are more open than usual, the ribs lose their convexity, and become flattened at the sides, and the sternum is pushed outwards, and forms a sort of ridge; the joints become enlarged, while the limbs between them appear, or become slender, and variously distorted; the spina dorsi in particular becomes very much incurvated, and the whole figure is sometimes distorted in such a manner as to resemble the letter S; the abdomen is hard and preternaturally tumid, and the other parts of the body are emaciated; the appetite is but little or not at all impaired, and the stools are frequent and loose; the dentition is not only slow but later than usual, and the teeth, soon after their appearance, become decayed, and frequently fall out; the faculties of the mind are sometimes impaired, more frequently, however, they possess a premature acuteness of the understanding; on the first appearance of the disease the system is but little affected, but after a short time febrile symptoms are generally present; the disease after a while often ceases to advance, and the health is re-established, but the limbs remain distorted; in other cases, it goes on increasing till every function is affected, and at length terminates in death, in consequence of inability to distend the chest, owing in all appearance to the softness of the bones. In the bodies of those who have died of this disease various morbid affections have been discovered in the internal parts in particular; the abdominal and thoracic viscera have been found in a diseased state, and the bones are sometimes so soft that they can be readily cut through with a knife.

The remote causes are, debility, an impure and humid state of the atmosphere, poor milk, hereditary disposition, bad air, deficiency of proper exercise, want of cleanliness, and an improper diet. The proximate cause is supposed to be a deficiency of calcareous earth and phosphoric acid.

The removal of this disease will be effected by gentle emetics in the first instance; it will not, however, be necessary to repeat them very frequently; bark should be administered in moderately large doses, but as there is often a difficulty in administering it in substance, in proper quantities, the extractum cinchonæ is to be preferred, or the oxyd or sulphat of zinc, or some of the preparations of iron must be employed, and they will be more efficacious if administered in combination with calcined hartshorn or chalk, or with a neutral salt and rhubarb, in such proportion as will keep the bowels gently laxative; the phosphate of lime and of soda are recommended in equal parts to the extent of a scruple, twice a-day; and washing the surface of the body with a solution of potash, in the proportion of half an ounce to a pint of water, morning and evening, is also of service, taking care, however, to wipe the skin perfectly dry; the body must be well rubbed with flannel, and the spina dorsi should be rubbed with volatile alkali; the diet should be light and nourishing, and port wine should be allowed; exercise in the open air, in dry weather, should be strictly enjoined, and as gestation can only be employed, the child should always be carried in a horizontal posture, as moving them in any degree of an erect one is liable to increase the distortion, and they should lie down frequently in the course of the day, and some of the ingenious contrivances mentioned in the Zoonomia should be employed: the cold bath may be made use of, or a bath of the temperature of the Matlock bath, which is 66°, or of the Buxton, which is 82°, would perhaps be preferable, and more beneficial. The prophylaxis consists in cold-bathing, frictions, and proper exercise.

Order III.

Impetigines. External deformities.—Cachexies chiefly deforming the skin and external parts of the body.

The following are the genera of this order. 1. Scrophula; king's evil. Swellings of the conglobate glands, especially in the neck; swelling of the upper lip and support of the nose; the face florid, skin thin, abdomen tumid. Four species; common, mesenteric, temporary, from resorption of the matter of ulcers in the head, and West Indian, catenated with the yaws. 2. Syphilis; venereal disease. A contagious disease after impure venery, and a disorder of the genitals; ulcers of the tonsils; of the skin, especially about the margin of the hair; corymbous papulæ terminating in crusts and crusty ulcers; pains of the bones and exostoses. 3. Scorbutus; scurvy. In cold countries attacking after putrescent diet, especially such as is salt and of the animal kind, and when there is no supply of fresh vegetables; asthenia; stomacace; spots of different colours on the skin, for the most part livid, and appearing chiefly among the roots of the hair. 4. Elephantiasis; Arabian leprosy. A contagious disease: thick, wrinkled, rough, unctuous skin, destitute of hairs; anæsthesia in the extremities, the face deformed with pimples; voice hoarse and nasal. 5. Lepra; Greek leprosy. Skin rough with white branny and chopped escars, sometimes moist beneath, with itching. 6. Frambæsia; yaws. Swellings resembling fungusses, or the fruit of the mulberry or raspberry, growing on various parts of the body. This disease is placed by some nosologists in the class and order pyrexiæ, exanthemata, as constantly accompanied with pyrexy, and only attacking a man once during life. 7. Trichoma; bleeding-hair. A contagious disease; the hairs thicker than usual, and twisted into inextricable knots and cords. It is almost confined to certain parts of the north of Europe; and rarely extends out of Poland. 8. Icterus; jaundice. Yellowness of the skin and eyes; white fæces; urine of a dark red; tinging what is put into it of a clay colour. Five species; calculous; spasmodic (after spasmodic diseases of the mind); hepatic; from pregnancy; and infantile, attacking infants a few days after birth: for which last see the article Infancy.

Scrophula.—The symptoms are known too generally. The most efficacious remedies which can be employed are sea-bathing, and the internal use of salt water; a change to a warm climate, and a nourishing diet. A trial of the chalybeate and sulphureous waters should be recommended; the digitalis and a solution of muriat of barytes have often been administered with evident advantage; the latter appears to be a medicine well calculated to correct the scrofulous diathesis; bark, combined with carbonat of soda, is strongly recommended; the preparations of iron should be ordered, and a small quantity of rhubarb should be joined with them; a grain or more of opium, twice a day, is sometimes of service; hemlock is getting into disuse, perhaps undeservedly. The external remedies most suitable for scrofulous tumors and ulcers are sea-water poultices, and bruised sea-tang; the

leaves of wood sorrel (oxalis acetosella) bruised, are strongly recommended, and appear to have been employed with advantage; linen rags kept constantly moistened with a solution of the sugar of lead, or of muriated mercury, should be applied to the parts affected; a small quantity of powder, composed of seven parts of bark, with one part of white oxyd of lead, is recommended to be applied to scrofulous ulcers, by means of lint and a bandage, and renewed daily; or they may be sprinkled with carbonat, or oxyd of zinc; it will be proper always to apply moderate pressure upon the parts, which will tend to heal the ulcers; oxygen gas has been employed with evident advantage; electricity might perhaps produce good effects, if had recourse to at the commencement of the disease; the solution of muriat of lime is strongly recommended, and it is certainly deserving of a full and fair trial; the dose should be gradually increased, and when qualms and sickness are produced, we may consider these as signs of an overdose; it is also proper to observe, that it is sometimes necessary to employ gentle laxatives under its use, as it is apt to induce costiveness.

Scorbutus—Soreness of the gums, with a spongy swelling, and bleeding upon the least touch; the face lurid; bloated; ancles œdematous; lassitude and depression of spirits; pains in the limbs and thorax; the hands contracted and rigid; the debility increasing, so that at length a simple attempt to acquire an erect position is productive of syncope, or even death. The appetite for food is generally unimpaired in every stage of the disease, the skin becomes dry and rough, and the urine is scanty and high-coloured; vibices appear in different parts of the body, and there are small specks, generally of a purple colour, very little raised above the surface of the skin, and if a part is bruised in any stage of the disease, ecchymosis immediately takes place; the pulse is generally weak, the tongue is of its natural appearance, the bowels are either very much confined, or the patient is troubled with diarrhœa, accompanied with griping pains. In the last stage of the disease the breath becomes remarkably fetid; the urine, after it has been voided some hours, is covered with an oily pellicle, and blood issues from the mouth, nose, anus, urinary passages, sometimes even from the ends of the fingers, and pores of the skin. There is a remarkable symptom sometimes attendant on this disease, even in its incipient state, mentioned by Dr. Blane, in his valuable work on the Diseases of Seamen, in which the patient complains of an almost total blindness towards evening, when no other visible symptom of the disease is present; but the complaint uniformly betrays itself by ecchymosis, in cases of bruises, or by scorbutic ulcers, which are very difficult of cure. It chiefly affects sailors, and people shut up in besieged places, who are deprived of fresh provisions and vegetables; this, however, is not always the case, as in cold climates it is sometimes produced by a very scanty though not salt diet, under the influence at the same time of cold, damp, and foul air and indolence.

This disease will be most certainly removed by fresh vegetables, and the expressed juice of lemons, limes, oranges, and other subacid fruits; the two first are, however, the most powerful antiscorbutics, and it is worthy of remark, that the recovery will be more speedy when fresh vegetables alone, and no animal food, are employed, than when fresh animal food is made use of without vegetables; the essence of malt, or of spruce, will often be found of considerable service. As there is generally an obstruction of the perspiration, we should endeavour to excite a gentle diaphoresis by means of the pulvis ipecacuanhæ compositus, or by camphor, combined with the nitre potassæ and opium; vegetables are particularly useful, such as celery, water-cresses, cabbages, mustard, horse-radish, and many others of the class tetradynamia. As a free flow of urine is found to promote recovery, we should endeavour to solicit it by means of some of the preparations of squills; wine, chalybeates, bark, and the mineral acids, should be exhibited, when lime or lemon juice cannot be procured, and sour krout, and what in Scotland is called souins, are very useful articles of diet: a solution of the nitre in vinegar, in the proportion of from two to four ounces of the former to a quart of the latter, is strongly recommended; from one to two ounces, or more, may be given two, three, or four times in the course of the day: the sponginess of the gums will be removed by a solution of the alum, or by astringent gargles, in which muriatic acid is a component part: the contraction of the hams, and the livor and hardness of the calves of the legs, will be relieved by warm fomentations and emollient poultices: a poultice of wood-sorrel should be applied to the ulcers, or, if that cannot be procured, the nitrous vinegar may be employed, but the best application is lemon juice. The remote causes must, as far as lies in our power, be avoided; the greatest attention must be paid to cleanliness; exercise must be enjoined, and the air must be corrected by fires and ventilation; the only certain preventives are fresh vegetables, exercise, and the nitric acid. Oxygen should be introduced into the system by such medicines as are known to contain it, or by inspiring it when chemically produced.

Icterus is easily discovered from the yellow hue it produces. The cure consists in the removal of the exciting causes, and alleviation of urgent symptoms; the most frequent exciting causes are calculi, the passage of which will be promoted by gentle emetics; for this purpose the ipecacuanha is the best medicine; it should be exhibited in small and divided doses, so as to occasion, for a time, a degree of nausea, but ultimately to produce its full effects; the costiveness must be removed by the calomel, combined with rhubarb and soap, or by administering oil of castor: where the pain is very violent, attended with a slow pulse, the warm bath and fomentations of the epigastrium will be necessary, or bladders filled with hot water, or bags of hot sand applied to it; opiates will be very serviceable, but as there is costiveness the inspissated juice of henbane would be a preferable medicine; æther, with yolk of egg, is recommended as having a tendency to dissolve inspissated bile; unboiled acrid vegetables are useful, as lettuce, mustard, cresses, &c. electric shocks should be passed through the duct, at proper intervals; mucilaginous diluents should be freely allowed, and emollient clysters should be frequently injected. In cases of pyrexy attended with local pain and dyspnœa, blood-letting and the antiphlogistic regimen may be employed with great advantage; and after the pain is removed and the arterial energy becomes weakened, some of the preparations of iron may be used with great benefit; seltzer or soda water should be drank in moderate quantities, or it may be made at the time of taking it by dissolving a drachm of the carbonat of soda in a pint of water, and adding twenty drops of muriatic acid, drinking it off as soon as mixed; or, instead of the muriatic

acid, it may be saturated with carbonic acid, by means of Dr. Nooth's glass apparatus; there is an artificial sort of seltzer water sold in London, which is prepared in a much better manner than we are able to do it in general, and the name of the proprietor is Schweppe. If the disease arises in consequence of tumors, or pressure of surrounding parts, small doses of the calomel, or some other preparation of mercury, may be useful, employing, at the same time, some of the preparations of iron, or natural chalybeate waters; gentle exercise on horseback is particularly serviceable in promoting the passage of calculi, and preventing the stagnation of bile in the gall-bladder.

CLASS IV.

Locales. Local affections.

A reference to the nosological table of the system we have selected in this work will prove this class to be of a very voluminous as well as of a very complicated nature; and as we have already observed intended to take in every disease which could not easily be introduced under the preceding classes. More than half the maladies of which this class consists belong to the department of surgery; such as, for instance, all the genera in the order tumores, and many of those in the order dialyses. Of the rest many are altogether incurable, and many may more conveniently be described under the article MIDWIFERY. On this account, instead of giving a detail of the entire genera, of which the present class consists, with their definitions and modes of treatment, we shall refer the reader to the previous table for their respective names and arrangements; and shall only select for further remark those that appear of more prominence and general importance than the rest, and which can only with propriety be described in the present article.

Amaurosis is loss of sight without visible cause or injury. In this disease the eyes appear natural, but the pupil is dilated, and does not contract upon being exposed to the strongest light; it is sometimes attended with head-ach. The remote causes are, compression of the brain, either from congestion or mechanical pressure, cataract, atony, paralysis of the optic nerve or inirritability of it. The proximate cause is the insensibility of the retina.

If the disease arise from the first-mentioned cause, it may be removed by the means necessary in those cases; when it arise from atony, or paralysis of the optic nerves, we must employ stimulants, as blisters to the temples; electricity is of singular service; sparks should be taken from the eyes, and shocks should be sent through the head; errhines will be very useful, as the turbeth mineral, in the proportion of a grain to eight of liquorice powder, one-fourth of which is to be snuffed up the nostrils once or twice a day; and we must at the same time employ the internal stimulants recommended in the treatment of paralysis; opium, and muriated mercury, in doses of a quarter of a grain of each twice a day, a blister on the crown of the head, and repeated minute electric shocks, passed through the eyes, are recommended in the early stages of this disease. The cataract, as requiring a surgical operation, does not properly come under consideration. Albugo, or opacity of the transparent cornea, which often remains after inflammation, or syphilis, may sometimes be removed by repeated blisters to the temples; the long-continued use of electricity, and the aqua ammoniareti cupri, should be introduced into the eye, and it will sometimes require dilution; or prepared glass reduced to an impalpable powder, in a mortar of agate, and mixed with honey or mucilage, is to be applied to the eyes by means of a camel-hair pencil, two or three times a day; the linimentum sepiæ compositum, and infusion of Guinea pepper, are recommended in strong terms, and are certainly deserving of a trial.

Of *Deafness* the causes are innumerable. It may be a defect in the organ of hearing; too great dryness of the ear, hardened accumulated wax obstructing the passage of sounds; inflammation of the membrana tympani, inflammation or obstruction of the Eustachian tubes, syphilis, and atony, or paralysis of the auditory nerves. When it arise in consequence of organic affection, all our endeavours will generally prove fruitless, but when it arise from obstruction of the Eustachian tube, it will be commonly removed by puncturing the membrana tympani: if from too great dryness of the ear, a few drops of a mixture, composed of half an ounce of oil of almonds, and forty drops of oil of turpentine, is recommended; it should be applied to the internal ear by means of a dossil of cotton, taking care to keep the cavity clean, by wiping it daily with a large camel-hair pencil. If it arise from hardened wax, the interior cavity must be softened by frequently injecting warm water and soap, or a solution of sea-salt in as much water as will barely dissolve it, which last is an excellent solvent of the wax; the ear may afterwards be cleansed by syringing it with warm water: the wax may also be softened by occasionally insinuating into the ear a few drops of a mixture, composed of three parts of ox gall, and one part of the balsam of Peru; this is also of service when there is a fetid discharge from the ear, or a diseased state of its secretions: when it arises in consequence of inflammation, topical blood-letting, blisters behind the ears, and exclusion of the external air, will be necessary. If the disease proceed from an affection of the Eustachian tubes, stimulating gargles and injection will be proper, at the same time powerful errhines may be employed; and where the patient hears better when there is a loud voice, he should stop the mouth and nostrils, and force the air into the tubes, by violent efforts of expiration, and if one effort be not sufficient for that purpose, he should employ repeated ones. When it is induced by atony, or paralyses, æther, garlic-juice, and other stimulants, should be applied by means of a dossil of cotton; errhines also are of considerable utility, and should be snuffed up the nose two or three times a day; blisters behind the ears, electricity, and internal stimulants, will likewise prove useful auxiliaries. If the disease arises in consequence of syphilis, we must apply to a full course of the mercury. Whenever deafness is not easily removed by the ordinary means, the application of blisters behind the ears will often be of service.

Enuresis. Involuntary flow of urine.—The causes are atony or paralysis of the sphincter of the bladder; irritation or compression of the vesica urinaria; the latter period of pregnancy; laxation of the vertebræ.

If the disease proceed from atony, the perinæum must be frequently bathed with cold water, repeated blisters must be applied to it, and to the os sacrum; we should at the same time administer internal tonics and stimulants, as bark, zinc, and some of the preparations of iron, tincture of cantharides, and the cold bath. If it be induced by paralysis, blisters, electricity, and internal stimulants must be employed. If from irri-

tation, or compression of the bladder, the cause of it must be discovered, and the proper means of removing it be had recourse to; and if it be a consequence of the pressure of the gravid uterus, the patient should be kept as much as possible in a horizontal posture.

Ischuria.—Of this disease there are four species: as affecting the kidneys, ureters, bladder, or urethra. The first proceeds from nephritis, calculi, spasm, grumous blood, or pus in the pelvis of the kidneys, paralysis, and sometimes inflammation of the intestines, or mesentery. If the disease arise from the first-mentioned cause, which will be readily discovered by a careful attention to the symptoms, it will be removed by the means pointed out when treating of that inflammation: if it be the consequence of calculi, which will be known by the attendant symptoms, which are a frequent desire of making water, often suddenly stopped as it flows in a full stream, heat and pain soon after the evacuation of it, tenesmus, an itchiness of the anus, and extremity of the urethra, colic pains, costiveness, nausea, and frequently vomiting, pain and retraction of the testes, and pain or a sense of weight in one or both thighs, blood-letting will be requisite, in proportion to the violence of the symptoms of excitement; laxatives will at the same time be necessary, and the antiphlogistic regimen must be strictly adhered to: the irritation will be allayed by the employment of the warm bath, fomentations, opiates, watery, farinaceous, and mucilaginous fluids, turpentine clysters, and stimulating liniments to the region of the kidneys. If it proceed from a spasmodic affection, opium, æther, hyoscyamus, and the warm bath, are the proper remedies: when it arise from grumous blood, or pus, contained in the pelvis of the kidneys, we must promote the expulsion of them by the warm bath, diluents, opiates, and emollient laxative clysters. If it proceed from paralysis, internal and external stimulants, electricity, and the remedies recommended in the treatment of paralysis, must be employed; and if from the last-mentioned cause, the most powerful means of removing such inflammations must be employed with diligence, and those means are pointed out in another place.

In ischury from complaint in the bladder there is a suppression of urine, accompanied with a circumscribed tumour of the hypogastrium, and a sense of distention in it, and an acute or obtuse pain about the neck of the bladder, attended with a frequent inclination to make water.

When the disease arises from the first-mentioned cause, it will be removed by blood-letting, laxatives, emollient laxative clysters, opiates, the warm bath, and friction of the hypogastrium, with a strong solution of camphor in olive oil, and if we do not succeed by those means, we must draw off the urine with the catheter; and in desperate cases have recourse to puncturing the bladder, either above the pubes or by passing a trocar into it from the rectum. If the disease arise from schirrus of the prostate gland, mercury, hemlock, sarsaparilla, and sea-bathing, should be recommended. If it be the consequence of paralysis, electricity, tincture of cantharides, and repeated small blisters will be proper. When it proceeds from spasm, opiates must be employed internally and externally, emollient laxative clysters, the warm bath, and a strong solution of the camphor; and if the patient be plethoric, it will be advisable to take away some blood. When the disease is caused by over-distention of the bladder, from the too long retention of the urine, cold substances must be applied to the hypogastric region, and cold water should afterwards be injected into the bladder. If induced by the presence of grumous blood, pus, or mucus, these are to be removed by tepid injections, diluents, and by the other means recommended in the treatment of the first species. If ectopia of the bladder be the occasion of it, we must endeavour to bring the parts into their proper situation, by the means adapted to their cause. If it arise from calculi, this will be discovered by there being an uneasy sensation, at the orifice of the urethra, after making water; sometimes a dull pain at the neck of the bladder, with a frequent desire of emptying the bladder, and the water often passing drop by drop, or the stream being suddenly interrupted; there will be also a considerable mucous sediment, and some degree of tenesmus, and the patient will generally void his urine, when in a horizontal position. Under these circumstances, when the pain is considerable, two drachms of turpentine, incorporated with yolk of egg, and mixed with half a pint of gruel, with from sixty to a hundred drops of laudanum, should be injected; costiveness must afterwards be obviated by rhubarb, combined with soap, or with small doses of calomel, or the saline cathartics; the uva ursi should be administered in doses of a scruple, or more, three times a day, and the dissolution of the calculus must be attempted by lithontriptics, as a drachm of the vegetable alkali, dissolved in a pint of water, supersaturated with carbonic acid gass, three times a day; seltzer or soda water may be employed with advantage, or a large spoonful of a mixture, composed of half an ounce of the aqua potassæ, and six ounces and a half of the aqua calcis, in some mucilaginous liquor, may be given three times a day: when scybala in the rectum occasion the disease, injections of warm oil, or the internal employment of oil of almonds or castor, with laxative and emollient clysters, together with dashing the lower extremities with cold water, will generally succeed in promoting their evacuation. If it arise from flatus, we must employ essential oils and antispasmodics. If it be the consequence of an abscess, which will be discovered by the previous throbbing pain and nature of the discharge, after the bursting of the abscess, the frequent use of warm emollient and oily clysters will be necessary; and if it arise in consequence of the pressure of the gravid uterus, the urine must be drawn off by means of the catheter, until after delivery; when the complaint will cease of course.

Herpes. Tetters.—This disease will be removed by the exhibition of some of the following remedies, as the sulphuric acid, tincture of cantharides, or black hellebore, or muriated mercury, combined with tartar emetic, and opium, Plummer's pill, or a solution of gamboge, in spirit of ammonia may be given; employing, at the same time, lime-water, or the decoction of guaiacum sarsaparilla or elder; the parts should be dressed with the unguentum nitratis hydrargyri, or with the sulphuric acid, mixed with eight times its quantity of pork lard: and we should at the same time employ the warm bath: the pulp of cassia moistened with milk, and the cassia sophera of Linnéus boiled in vinegar, are recommended upon good authority.

Tinea. Scald-head.—This contagious eruption affects the whole of the hairy scalp, and is gener-

ally most virulent around the edges of the hair, on the back part of the head, often causing, by the acrimony of the discharge, swelling of the lymphatic glands of the neck. The first step necessary to be taken in the removal of this unpleasant complaint will be to shave the head close, after which it should be well fomented, and cloths moistened in a solution of liver of sulphur in lime water, in the proportion of half an ounce of the former to a pint of the latter, should be constantly applied to the head, or tar-ointment may be employed, and the access of the air should be prevented by means of a bladder, properly fitted to the head, or a solution of sugar of lead, or of green or blue vitriol, may be tried, and the internal remedies recommended in the treatment of herpes should be employed: if we do not succeed by these means, blisters or an issue should be applied on the head or adjacent parts.

Psora. Itch.—This consists of little watery pimples of a contagious nature, which first appear between the fingers and on the wrists, but in process of time spreading over the whole body, except the face, attended with a great degree of itchiness, especially when warm in bed, or exposed to the heat of a fire. This disease will most certainly be cured by the application of sulphur ointment, taking at the same time flowers of sulphur; the unguentum calcis hydrargyri albi or acidi sulphurici, or a solution of oxyd of arsenic, or of muriated mercury, will also speedily remove it; the two last remedies should, however, be employed with much caution; a decoction of white hellebore is also a useful remedy. It may likewise be frequently cured by the exhibition of the sulphuric acid, in doses of from thirty to sixty drops, or more, two or three times a day, and to obviate its griping, it should be given in some mucilaginous fluid.

MEDICIS (Cosmo de), called the Elder, son of John de Medicis, was born at Florence, September 1389. Although in a private station, he appeared with the splendour of the most powerful sovereign; and his fortune, accumulated by successful commerce, was surpassed by the revenue of few princes. He was partial to the sciences, and liberal to men of genius. His library consisted of a vast number of books of his own collecting, and he enriched it with many scarce and valuable manuscripts. Banished from his native country by the envy which his riches inspired, he went to Venice, where he was received with the honours due to a sovereign prince. His countrymen soon perceived their error, and recalled him from banishment. For 34 years he was supreme judge of the republic; and his advice was solicited by the greater part of the cities and sovereignties of Italy. This great man died August 1464, in the 75th year of his age, full of happiness and glory. On his tombstone he is styled, "Father of the people, and deliverer of his country."

MEDICIS (Laurence de), styled the Great and the Father of learning, was born A.D. 1448. He was the son of Peter, the grandson of Cosmo, and the brother of Julian de Medicis. These two brothers, who were in possession of absolute power at Florence, excited the jealousy of Ferdinand of Naples and Pope Sixtus IV. The first hated them, because they had ruined his influence in Florence; and the second, because they opposed the advancement of his nephew. It was at their instigation that the Pazzi conspired against them. Julian was murdered while he heard mass April 26th 1478; and Laurence, who was only wounded, was carried back to his house in the midst of the shouts and acclamations of the people. Heir to the greater part of his grandfather's virtues, he was, like him, the Mæcenas of his age. It was equally astonishing (says an historian of that country) and foreign to our manners, to see the same man engaged in commerce, and supporting the burden of the public affairs; conversing with factors, and receiving ambassadors; giving shows to the people; affording an asylum to the unfortunate; and adorning his country with many magnificent buildings. He was so much beloved by the Florentines, that they appointed him chief magistrate of the republic. By his unbounded liberality, he drew to his court a great number of learned men. He sent John Lascaris into Greece to recover manuscripts, with which he enriched his library. He cultivated learning himself, and was the author of the following works: 1. Des Poesies Italiennes, Venice, 1554, 12mo. 2. Canzonne à ballo, 1568, 4to. 3. La Campagnia del Mantellaccio Beoni, with the sonnets of Burchiello, 1558 or 1568, 8vo. Laurence de Medicis was so universally admired, that the princes of Europe did him the honour to appeal their differences to his decision. It is even reported, that Bajazet emperor of the Turks, to shew him a mark of esteem and regard, caused search for the murderers of his brother Julian in Constantinople, and sent back one of them who had concealed himself in that city. Pope Sixtus IV. was the last of his enemies; but he opposed him with so much ability, that he brought him to terms of accommodation. This illustrious man died April 9th 1492, aged 44. His reputation was sullied by his passion for women and by his infidelity. His two sons, Peter who succeeded him and who was expelled from Florence in 1494, and John who went by the name of pope Leo X. were like their father remarkable for their generosity and their love of learning. Peter died in 1594, leaving Laurence, the last male issue of his branch. Laurence was the father of Catharine de Medicis, who married Henry II. king of France.

Mr. Roscoe has written an elegant life of this Laurence de Medicis, in 2 vols. 4to.

MEDIETAS LINGUÆ, in law, signifies a jury, or inquest impannelled, of which the one half are natives of this land and the other foreigners. This jury is never used except where one of the parties in a plea is a stranger and the other a denizen. In petit-treason, murder, and felony, foreigners are allowed this privilege; but not in high-treason, because an alien in that case shall be tried according to the rules of the common law, and not by a medietas linguæ. A grand jury ought not in any case to be of a medietas linguæ; and the per-

son that would have the advantage of a trial in this way is to pray the same, otherwise it will not be permitted on a challenge of the jurors.

MEDI'ETY. *s.* (*mediété*, French.) Middle state; participation of two extremes; half (*Brown*).

MEDINA, a city of Arabia Felix, in the province of Hedjas, about a day's journey from the Red sea. It is a town of moderate extent, surrounded with indifferent walls, and situated in a sandy plain. It belongs to the sherriffe of Mecca, but has of late been governed by a sovereign of its own, of the family of Darû Barkad. At this present time, the sherriffe rules it by a vizir, who must be of the royal family. Before the days of Mahomet, this city was called Jathreb, but it was called Medinet en Nebbi, the city of the prophet, from the period at which Mahomet, upon his expulsion out of Mecca, by the Koreischites, took refuge here, and continued to make it the place of his residence for the rest of his life. The tomb of Mahomet at Medina is held in respect by the Mussulmans; but they are not obliged to visit it in order to the performance of any devotional exercises; only, as the caravans from Syria necessarily pass near by Medina, in their return from Mecca, they turn aside to behold the prophet's tomb. It is situate in the corner of the great square; whereas the Kaba is in the middle of the square at Mecca. For fear that the people might superstitiously offer worship to the ashes of the prophet, the tomb is inclosed within the iron rails, and is only to be seen by looking through these. This tomb is placed between two other tombs, in which rest the ashes of the two first caliphs. Although not more magnificent than the tombs of the founders of most other mosques, the building that covers it is hung with a piece of silk stuff, embroidered with gold, which is renewed every seven years, by the pacha of Damascus. This building is guarded by forty eunuchs, chiefly for the security of the treasure which is said to be kept in it. This treasure consists chiefly of precious stones, the offerings of rich Mussulmans. An eminent Arabian merchant informed Mr. Niebuhr, that the guard was posted for no other purpose than to keep off the populace, who had begun to throw dirt upon the tomb, which they afterwards scraped off, and preserved as a sort of relic: 176 miles N. Mecca. Lon. 57. 10 E. Lat. 25. 0 N.

MEDINA, a town of Spain, in Old Castile: twelve miles N. Frias.

MEDINA-DE-LAS-TORRES, a very ancient town of Spain, in Estramadura, with an old castle, and the title of a duchy. It is seated on the confines of Andalusia, at the foot of a mountain near Badajoz.

MEDINA-DEL-CAMPO, a large, rich, and ancient town of Spain, in the kingdom of Leon. The great square is very fine, and adorned with a superb fountain. It is a trading place, enjoys great privileges, and is seated in a country abounding with corn and wine. Lon. 4. 29 W. Lat. 41. 22 N.

MEDINA-DEL-RIO-SECCO, an ancient and rich town of Spain, in the kingdom of Leon, with the title of a duchy; seated on a plain, where there are fine pastures. Lon. 4. 33 E. Lat. 42. 8 N.

MEDINENSIS VENA, (*Medinensis*, because said to be common at Medina, and *vena*, a whim or sport, it having been long doubtful whether it were an animal or no.) Dracunculus. Gordius medinensis of Linnéus. The hair-worm: a very singular animal which in Guinea and some other countries inhabits the cellular membrane, between the skin and muscles. See GORDIUS.

MEDIO'CRITY. *s.* (*mediocrité*, French.) 1. Moderate degree; middle rate (*Wotton*). 2. Moderation; temperance (*Hooker*).

MEDIOLANUM, an ancient city, the capital of the Insubres, built by the Gauls on their settlement in that part of Italy. A municipium, and a place of great strength. The seat of the liberal arts; whence it had the name of Novæ Athenæ. Now Milan, capital of the Milanese, situated on the rivers Olana and Lombro. Lon. 9. 30 E. Lat. 45. 25 N.

MEDIOLANUM AULERCORUM, in ancient geography, a town of Gallia Celtica, which afterwards took the name of the Eburovicum Civitas (Antonine); corrupted to Civitas Ebroicorum, and this last to Ebroica; whence the modern appellation of Evreux, a city of Normandy. Lon. 1. 12 N. Lat. 49. 21 N.

MEDIOLANUM GUGERNORUM, in ancient geography, a town of Gallia Belgica; now the village Moyland, not far from Cologne.

MEDIOLANUM ORDOVICUM, in ancient geography, a town of Britain, now Llan Vethlin, a market-town in Montgomeryshire, in Wales.

To ME'DITATE. *v. a.* (*meditor*, Latin.) 1. To plan; to scheme; to contrive (*Dryden*). 2. To think on; to revolve in the mind (*Spenser*).

To ME'DITATE. *v. n.* To think; to muse; to contemplate (*Taylor*).

MEDITA'TION. *s.* (*meditatio*, Latin.) 1. Deep thought; close attention; contrivance; contemplation (*Bentley*). 2. Thought employed upon sacred objects (*Spenser*). 3. A series of thoughts, occasioned by any object or occurrence.

ME'DITATIVE. *a.* (from *meditate.*) 1. Addicted to meditation (*Ainsworth*). 2. Expressing intention or design.

MEDITERRANEAN, something inclosed within land; or that is remote from the ocean.

MEDITERRANEAN, is more particularly used to signify that large sea which flows between the continents of Europe and Africa, entering by the straits of Gibraltar, and reaching into Asia, as far as the Euxine sea and the Palus Mæotis. The Mediterranean was anciently called the Grecian sea and the Great sea. It is now cantoned out into several divisions, which bear several names. To the west of Italy it is called the Ligustic or Tuscan sea; near Venice, the Adriatic; towards Greece, the Ionic and Ægean; between the Hellespont

and the Bosphorus, the White sea, as being very safe; and beyond, the Black sea, its navigation being dangerous. The British trade carried on by means of the Mediterranean sea is of the last consequence to Great Britain; and the permanent preservation thereof depends upon the possession of the town and fortification of Gibraltar.

The counterfeiting of Mediterranean passes for ships to the coast of Barbary, &c. or the seal of the admiralty-office to such passes, is felony without benefit of clergy. Stat. 4 Geo. II. c. 18.

MEDITRINALIA, a Roman festival in honour of the goddess Meditrina, kept on the 30th of September. Both the deity and the festival were so called *à medendo*, because on this day they began to drink new wine mixed with old by way of medicine.

MEDITULLIUM. (*meditullium*, from *medius*, the middle.) See DIPLOE.

MEDIUM. *s.* (*medium*, Latin.) 1. Any thing intervening (*Bacon*). 2. Any thing used in ratiocination, in order to a conclusion (*Baker*). 3. The middle place or degree; the just temperature between extremes (*L'Estr.*).

MEDIUM, in logic, the mean or middle term of a syllogism, being an argument, reason, or consideration, for which we affirm or deny any thing: or, it is the cause why the greater extreme is affirmed or denied of the less in the conclusion.

MEDIUM, in arithmetic, or arithmetical medium, or mean, called in the schools, medium rei, that which is equally distant from each extreme, or which exceeds the lesser extreme as much as it is exceeded by the greater, in respect of quantity not of proportion: thus 9 is a medium between 6 and 12. See PROPORTION.

MEDIUM (Geometrical), called in the schools medium personæ, is that where the same ratio is preserved between the first and second, as between the second and third terms, or that which exceeds in the same ratio, or quota of itself, as it is exceeded: thus 6 is a geometrical medium between 4 and 9.

MEDIUM, in philosophy, that space or region through which a body in motion passes to any point; thus æther is supposed to be the medium through which the heavenly bodies move; air, the medium wherein bodies move near our earth; water, the medium wherein fishes live and move; and glass is also a medium of light, as it affords it a free passage. That density or consistence in the parts of the medium, whereby the motion of bodies in it is retarded, is called the resistance of the medium, which together with the force of gravity, is the cause of the cessation of the motion of projectiles.

MEDIUM (Subtle or Æthereal). See ÆTHER.

MEDLAR, in botany. See MESPILUS.

To ME'DLE. *To* MEDLY. *v. a.* To mingle (*Spenser*).

ME'DLEY. *s.* (from *meddle* for *mingle*.) A mixture; a miscellany; a mingled mass (*Walsh*).

ME'DLEY. *a.* Mingled; confused (*Dryden*).

MEDUA, a town of the kingdom of Algiers, seated in a country abounding in corn, fruits, and flocks of sheep, 175 miles S.W. of Algiers. Lon. 0. 13 E. Lat. 34. 45 N.

MEDULLA. (*medulla, quasi in medio ossis.*) The marrow. (See MARROW.) The pith or pulp of vegetables.

MEDULLA OBLONGATA. The medullary substance of the same use as the cerebrum, that lies within the cranium, upon the basillary process of the occipital bone. It is formed by the connection of the crura cerebri and crura cerebelli, and terminates in the spinal marrow. It has several eminences, viz. pons varolii, corpora pyramidalia, and corpora olivaria

MEDULLA SPINALIS. The spinal marrow. A continuation of the medulla oblongata, which descends into the specus vertebralis from the foramen magnum occipitale, to the third vertebra of the loins, where it terminates in a number of nerves, which, from their resemblance, are called *cauda equina.* The spinal marrow is composed, like the brain, of a cortical and medullary substance: the former is placed internally. It is covered by a continuation of the dura mater, pia mater, and tunica arachnoidea. The use of the spinal marrow is to give off, through the lateral or intervertebral foramina, thirty pairs of nerves, called cervical, dorsal, lumbar, and sacral nerves.

MEDULLARY. (*medullaris*, from *medulla*, marrow.) Marrow-like.

MEDULLARY SUBSTANCE. The white and internal substance of the brain is so called

MEDUSA, in fabulous history, the eldest daughter of Ceto and the sea-god Phorcus, went with her two sisters to inhabit the isle of Gorgons, from which name they were called the Gorgons. Neptune falling in love with Medusa, chiefly on account of the beauty of her hair, carried her off, and took her to the temple of Minerva, where he debauched her; when Minerva being enraged at the profanation of her temple, transformed Medusa's hair into snakes, and caused those who looked at her to be turned to stone. But Perseus being furnished with Mercury's winged shoes, and the sword with which he had killed Argus, attacked Medusa, and cut off her head, and from her blood sprung up Pegasus and Chrysaor. The conqueror placed Medusa's head on the ægis of Minerva, which he had used in his expedition; and the head still retained the same petrifying powers as before.

MEDUSA, in zoology, a genus of the class vermes, order mollusca. Body gelatinous, orbicular, and generally flat underneath; mouth central, beneath. The gelatinous mass constituting the body is of a different figure, furnished with arms or tentacular processes proceeding from the lower surface; the larger species when touched cause a slight tingling and redness, and are usually denominated sea-nettles. They are supposed to constitute the chief food of cetaceous mammals, and most of them shine with great splendour in the water. Forty-four

species; the greater number with a smooth body, a few with ciliate ribs on the body. They are scattered over the waters of the globe; ten of them common to our own coasts. Some contract into the shape of a pigeon's egg; others into the resemblance of an apple, of a nutmeg, or of half a cherry: the colour is generally bluish, reddish, or yellowish brown; texture usually transparent or hyaline. Some of them are very splendid in the water; especially M. noctiluca, an inhabitant of the Atlantic and Mediterranean seas; it wanders in large groupes, illuminating the water; and if shaken in sea-water they emit considerable sparks of light.

MEDUSA'S HEAD, in botany. See EUPHORBIA.

MEDUSULA, in botany, a genus of the class cryptogamia, order fungi. Fungus solid, globular, spissitate, crowded; seeds external, filiform, flexile, colliquescent. One species only; M. labyrinthica, an exotic.

MEDWAY, a river which rises in Ashdown forest, in Sussex; entering Kent, it waters Tunbridge, and at Maidstone is navigable to Rochester; below which, at Chatham, it is a station for the royal navy. Dividing into two branches, the western one enters the Thames, between the isles of Grain and Shepey, and is defended by the fort at Sheerness. The eastern branch, called the East Swale, passes by Queenborough and Milton, and falls into the German ocean, below Feversham.

MEDWI, a town of Sweden, in E. Gothland, called the Swedish Spa, on account of its waters, which are vitriolic and sulphureous. The lodging houses form one street of uniform wooden buildings painted red. The walks and rides are delightful, particularly on the banks of the Wetter. It is three miles from Wadstena.

MEDZIBOZ, a town of Poland, in the palatinate of Volhinia, seated on the river Bog: 20 miles S. of Constantinow.

MEED. *s.* (meꝺ, Saxon.) 1. Reward; recompence (*Milton*). 2. Present; gift (*Shakspeare*).

MEEK. *a.* (*minkr*, Islandic.) Mild of temper; not proud; not rough; soft; gentle (*Milton*).

To ME'EKEN. *v. a.* (from *meek*.) To make meek; to soften (*Thomson*).

ME'EKLY. *ad.* (from *meek*.) Mildly; gently.

ME'EKNESS. *s.* (from *meek*.) Gentleness; mildness; softness of temper (*Atterbury*).

MEER. *a.* (See MERE.) Simple; unmixed.

MEER. *s.* (See MERE.) A lake; a boundary.

ME'ERED. *a.* Relating to a boundary (*Shakspeare*).

MEEREN, or MEER (John Vander), called the *Old*, an esteemed painter, was born in 1627; but the master under whom he learned the art of painting is not mentioned. His genius directed him to choose for his subjects sea-pieces, landscapes, and views of the sea and its shores; which he painted with great truth, as he had accustomed himself to sketch every scene after nature. The situations of his landscapes are agreeably chosen, frequently they are solemn, and generally pleasing. The forms of his trees are easy and natural, his distances well observed, and the whole scenery has a striking effect, by a happy opposition of his lights and shadows. He also very often painted battles in such a style as met with approbation; as they showed good composition, were touched with spirit, and had a great deal of transparence in the colouring. But the fault imputable to Vander Meer is, that in some of his pictures the back-grounds are a little too blue, and that some of his landscapes have a tint which appears rather too yellow. He died in 1690.

MEEREN, or MEER (John Vander), called *De Jonghe*, an eminent landscape-painter, is supposed to have been the son of the old John Vander Meer, and of whom he learned the first rudiments of the art; but being in his youth deprived of his instructor before he had made any great progress, he became a disciple of Nicholas Berghem, and was accounted the best of those who were educated in the school of that admired master. In the manner of his master, he painted landscapes and cattle; and his usual subjects are cottages, with peasants at their rural occupations and diversions. It is observed of him, that he very rarely introduced cows, horses, or any other species of animals, except goats and sheep; the latter of which are so highly finished, that one would imagine the wool might be felt by the softness of its appearance. His touch is scarce perceptible, and yet the colours are admirably united. He died in 1688. The genuine works of this Vander Meer bear a very high price, and are esteemed even in Italy, where they are admitted into the best collections; but the scarcity of them has occasioned many moderate copies after his works to be passed on the undiscerning for real originals.

MEERSCHAUM. Wern. Ecume de Mer. Broch. Keffekil. Kirw. In mineralogy, a genus of the class earths, order siliceous. Colour yellowish-white, passing to Isabella yellow, greyish or reddish; massy; dull; fracture fine-grained, earthy, passing into flat, conchoidal, or small slates: specific gravity 1.6.

Found in the Crimea, and exported in great quantities to Constantinople, under the name of Keffekil, or earth of Kaffa, from the name of the town in the Crimea whence it is shipped; and used by the Turkish women instead of soap, or fuller's earth; used also for the bowls of the Turkish pipes. Found likewise in Natolia and the islands Samos and Negropont in the Archipelogo. A variety of it found at Castel del Piano near Sienna, and formed by Fabroni into bricks so light as to float upon the water, thus restoring one of the lost arts recorded by Strabo and Pliny.

MEET. *a.* (of obscure etymology.) 1. Fit; proper; qualified (*Whitgift*). 2. MEET *with*. Even with (*Shakspeare*).

To MEET. *v. a.* pret. I *met*; I have *met*; part. *met*. (metan, Saxon, to find.) 1. To

come face to face; to encounter (*Shakspeare*). 2. To encounter in hostility (*Milton*). 3. To encounter unexpectedly (*Milton*). 4. To join another in the same place (*Shakspeare*). 5. To close one with another (*Addison*). 6. To find; to light on (*Pope*).

To MEET. *v. n.* 1. To encounter; to close face to face. 2. To encounter in hostility (*Dryden*). 3. To assemble; to come together (*Tillotson*). 4. *To* MEET *with.* To light on; to find. 5. *To* MEET *with.* To join (*Shakspeare*). 6. *To* MEET *with.* To suffer unexpectedly (*Shakspeare*). 7. To encounter; to engage (*Rowe*). 8. To obviate. A latinism (*Bacon*). 9. To advance half way (*South*). 10. To unite; to join.

MEETER. *s.* (from *meet.*) One that accosts another (*Shakspeare*).

MEETING. *s.* (from *meet.*) 1. An assembly; a convention (*Spratt*). 2. An interview (*Shakspeare*). 3. An assembly of dissenters. 4. A conflux: as, *the* meeting *of two rivers.*

MEETING-HOUSE. *s.* (*meeting* and *house.*) Place where dissenters assemble to worship (*Addison*).

MEETLY. *ad.* (from the adj.) Fitly; properly.

MEETNESS. *s.* Fitness; propriety.

MEGÆRA, in fabulous history, one of the furies, who, according to the poets, were the daughters of Acheron and Night.

MEGARA, a town of Livadea, formerly very large, but now inconsiderable. It has some fine remains of antiquity, and is 20 miles W. of Athens. Lon. 23. 30 E. Lat. 38. 0 N.

MEGATHERIUM. Mammoth. In zoology, a genus of the class mammalia, order bruta. It has a near resemblance to the elephant, but having never been found alive, nor even with its organs in a perfect state after death, we are not able to give its generic characters very accurately. From some late accounts received from St. Petersburg, it is supposed by some that the animal is still in existence, its carcase having been found nearly fresh, though it has never been seen actually alive. Its residence appears to have been confined to a line in the northern hemisphere, extending from Siberia to the banks of the Ohio, and the name of mammoth was first given to the dug-up skeleton of the animal by Siberian peasants.

The following account, received from St. Petersburgh, is the fullest and most accurate that has hitherto been published, and relates to a specimen found, not indeed alive, but complete, and in a state of nearly perfect preservation.

Schoumachoff, a Tungoose chief, about the end of August 1799, when the fishing in the river Lena was over, repaired according to annual custom to the sea-side. Leaving his family in their huts, he coasted along the shore in quest of mammoth's tusks, and one day perceived in the midst of a rock of ice a large shapeless block, not at all resembling the logs of drift wood commonly found there. He climbed the rock, and examined it all round, but could not ascertain what it was. The next year, visiting the same spot, he found there the carcase of a seacow (*trichecus rosmarus*); and observed, not only that the mass he had seen the year before was freer from ice, but that there were two similar pieces by the side of it. These afterwards turned out to be the feet of the mammoth. In 1801, the side of the animal and one of its tusks appearing very distinctly, he acquainted his wife and some of his friends with what he had found. This however gave them great alarm, for the old men said, that they had been told by their forefathers a similar monster was once before seen in those parts, and the whole family of the person who discovered it soon became extinct. At this Schoumachoff was so much alarmed, that he fell sick. On his recovery, however, he could not relinquish the expectation of the profit he might make of the tusks; and directed his servants to conceal the circumstance carefully, and endeavour to keep away all strangers by some pretext or other. It was not till the fifth year, that the ice had melted sufficiently to disengage the mammoth, when it fell over on its side upon a bank of sand. Schoumachoff then cut off the tusks, which he bartered for goods to the value of 50 rubles (11l. 5s.) with a Russian merchant. Being satisfied with this, the carcase was left to be devoured by the bears, wolves, and foxes, except what the Yakouts in the neighbourhood cut off to feed their dogs. Previous to this, indeed, he had a rude drawing made of it, which represents it with pointed ears, very small eyes, horse's hoofs, and a bristly mane extending along the whole of its back. In this it has the appearance of something between a pig and an elephant.

In 1806, Mr. Mich. Adams, of Petersburg, being at Yakoutsk, fortunately heard of this circumstance, and repaired to the spot. When he arrived there, the skeleton, nearly stripped of its flesh, was entire, one of the fore-feet excepted. The vertebræ, from the head to the os coccygis, one of the shoulderblades, the pelvis, and the remaining three extremities, were still held firmly together by the ligaments of the joints, and by strips of skin and flesh. The head was covered with a dry skin. One of the ears, well preserved, was furnished with a tuft of bristles. These parts could not avoid receiving some injury during their removal to Petersburg, a distance of 11000 wersts [6875 miles]: the eyes however are preserved, and the pupil of the left eye is still distinguishable. The tip of the under lip was eaten away; and the upper being destroyed, the teeth were exposed. The brain, which was still within the cranium, appeared dry. The parts least damaged were one of the fore-feet and one of the hind: these were still covered with skin, and had the sole attached to them.

According to the Tungoose chief the animal was so corpulent and well fed, that its belly hung down below the knee joints. It was a male, with a long mane, but had neither tail nor trunk. From the structure of the os coccygis however, Mr. Adams is persuaded, that it had a short thick tail: and from the small-

ness of its snout, and the size of its tusks, he conceives it could not have been able to feed without the assistance of a proboscis; but Schoumachoff persisted in the assertion, that he never saw any appearance of a trunk, and it does not appear probable, that even his rude draughtsman would have omitted such a striking feature. The skin, three-fourths of which are in possession of Mr. Adams, the part that lay on the ground having been preserved, was of a deep gray colour, and covered with reddish hair and black bristles. These, from the dampness of the ground, had lost some part of their elasticity. More than a poud [40lbs.] weight of them, that had been trodden into the ground by the bears, was collected, many of them an archine [2 feet 4 in.] long. What remained of the skin was so heavy, that ten persons found great difficulty in carrying it to the seaside, in order to stretch it on logs of wood. The head weighs 11¼ pouds [460 lbs.]; the two horns, each of which is 1¼ toise [9¼ feet] long, weigh 10 pouds [400lbs.]; and the entire animal measured 4½ archines [10½ feet] high, by 7 [16¼ feet] long. Mr. Adams has seen tusks of the mammoth so curved as to form three-fourths of a circle; and one at Yakoutsk 2½ toises [15 feet 9 in.] long, an archine [2 feet 4 in.] thick near the root, and weighing 7 pouds [280 lbs.]. They are curved in the direction opposite to those of the elephant, bending towards the body of the animal; and the point is always more or less worn on the outside, so that the right tusk is easily distinguishable from the left. He adds, that he found a great quantity of amber on the shores.

In America this animal, or one so nearly resembling it, as probably to be only a distinct species of the same genus, has only been found in a fossil state; and generally only particular parts or bones of the animal have been discovered in one place, though other parts have often been traced at no great distance. This has frequently occurred near the lakes of Canada, where the animal is called by the savages, the father of oxen; near the rivers which fall into the Ohio; towards the rivers Miami, Muskingum, in the state of Kentucky, and of Tennessee, &c. &c. but principally near the salt springs, where pieces of skeletons and tusks have been found, of an astonishing length and weight.

A femur and a tibia have been found, which, when united, must have been five feet and a half high; another femur, which was alone five feet long, and 36 inches in circumference in its middle or cylindrical part; ivory tusks resembling those of an elephant, which were near seven feet long, and one foot six or eight inches in circumference at the base. Doctor Barton and doctor Wislar, of Philadelphia, have in their possession the lower jaw almost entire, with two teeth on either side, in particular, that of the former has five and three points, all quite double; but no one had the entire head.

The state of New York (in the environs of the beautiful river Hudson) has of late years been the theatre of discoveries of the fossil bones, apparently of the same animal, a greater quantity of them having been found there than any where else. In 1800, by digging in the low and marshy places of the counties of Orange and Ulster, at three, four, and five feet deep, parts, which had never before been discovered, were found. Some bones, ten feet deep in the earth, were as sound and entire as those which had been met with nearer the surface. Some, however, were found broken, particularly those of the head.

In another place, eight miles from the city of New York, an upper jaw was found perforated to receive a tusk like that of an elephant; the connection of the tusks was by *gomphosis*; the tusks were evidently of ivory; the openings for the nostrils were eight inches in diameter; and notwithstanding that the bones of the feet afford reason to conclude that the animal had claws, it is scarcely possible to avoid thinking, from the structure of the head, that it was a species of elephant. Some hair has even been found, three inches in length and of a dark colour, which is said to have belonged to this monstrous quadruped, and seems very considerably to assimilate it to the mammoth of Siberia; though M. Cuvier inclines to believe that the two animals constituted different genera, the tusks of the Siberian animal exhibiting more of a genuine elephant or ivory structure, and less sharpness in its grinders.

In the year 1801, Mr. William Peale, proprietor of the museum at Philadelphia, succeeded in obtaining a skeleton so nearly complete, as by the addition of one or two defective bones obtained from the fossile remains of other animals of the same kind, to render it perfect. This skeleton was brought over to England by the son of the discoverer, and publicly exhibited in 1803; the writer of the present article examined it minutely, and from actual measurement, and the information of the proprietor, is able to give the following detail. The skeleton was dug up in a morass in the county of Orange, state of New York, about 60 miles N.N.W. from the city of this name, where it was accidentally discovered by farmers who were digging shell marle for manure. The skeleton measured eleven feet high, seventeen and a half long, and five feet eight inches wide: the under jaw alone weighed sixty-three pounds, and the whole skeleton about a thousand pounds. The tusks were different in form and substance from those of the elephant; the spinous processes over the shoulders were prodigiously large and ridgy, so that the back must have been sharp like that of the hog; the ribs were short, narrow, and placed edgewise, and altogether unlike those of the elephant, which are broad and flat; the tail, unlike that of the Siberian mammoth, appeared to have been long, broad, and flat; the scapulæ were unlike those of other animals. The Philosophical Society of Philadelphia is in possession of a skeleton in some degree more perfect.

The generic name of Megatherium was first bestowed upon this animal by M. Cuvier, who appears accurately to have examined its skele-

ton: and to this generic name he added the trivial name of Americanum, to distinguish the individual from which his observations was made. In Dr. Shaw it occurs under the name of Manis Megatherium.

The following is M. Cuvier's description.

"This skeleton is fossil. It was found a hundred feet beneath the surface of a sandy soil in the vicinity of the river of La Plata. It only wants the tail, and some pair-bones, which have been imitated in wood; and the skeleton is now mounted at Madrid. This skeleton is twelve feet (French) long, by six feet in height. The spine is composed of seven cervical, sixteen dorsal, and four lumbar vertebræ: it has consequently sixteen ribs. The sacrum is short: the ossa illia very broad; and their plane being almost perpendicular to the spine they form a very open pelvis. There is no pubis or ischium: at least they are wanting in this skeleton, and there is no mark of their having existed when the animal was alive.

"The thigh bones are excessively thick, and the leg bones still more so in proportion. The entire sole of the foot bore on the ground in walking. The shoulder-blade is much broader than long. The clavicles are perfect, and the bones of the fore-arm are distinct and moveable upon each other. The fore limbs are longer than the hind. To judge by the form of the last phalanges, there must have been very long pointed claws, enclosed at their origin in a long sheath. There appears to have been only three of these claws on the fore-feet, and a single one on the hind. The other toes seem to have been deprived of them, and perhaps entirely concealed beneath the skin.

"The head is the greatest singularity of this skeleton. The occiput is elongated and flattened, but it is pretty convex above the eyes. The two jaws form a considerable projection, but without teeth, all grinders, with a flat crown and grooved across. The breadth of the branches of the lower jaw, and the great apophysis placed on the base of the zygomatic arch deserve particular notice.

"This quadruped in its character, taken together, differs from all known animals: and each of its bones considered apart, also differs from the corresponding bones of all known animals. This results from a detailed comparison of the skeleton with that of other animals, and will readily appear to those who are conversant in such researches: for none of the animals which approach it in bulk have either pointed claws, or similarly formed head, shoulder-blades, clavicle, pelvis or limbs.

"As to its place in the system of quadrupeds, it is perfectly marked by the sole inspection of the ordinary indicatory characters, that is, the claws and teeth. These show that it must be classed in the family of unguiculated quadrupeds destitute of cutting teeth; and in fact it has striking relations with those animals in all parts of its body. This family is composed of the Sloth (Bradypus), Armadillo (Dasypus), Pangolin (Manis), Ant-eater (Myrmecophagus), and Cape Ant-eater (Orycteropus).

"The great thickness of the branches of the lower jaw, surpassing even that of the elephant, seems to prove that this vast animal was not content with leaves, but like the elephant and rhinoceros, broke n ground the branches themselves; its close and flat-crowned teeth appearing very proper for that purpose. The position of the bones of the nose having some analogy with that of the elephant and tapir would induce a suspicion that our animal wore a trunk, but it must have been very short, since the length of the head and neck together only equals that of the fore legs. However this be, we find, in the absence of canine teeth, and the shortness of the muzzle, sufficient characters to constitute a new genus in the family of the edentated, which ought to be placed between the sloth and the armadillo; since to the shape of the head of the former it joins the teeth of the latter. It would be necessary to know particulars of which a skeleton cannot inform us, such as the nature of the teguments, the form of the tongue, the position of the mammæ, &c. in order to determine to which of these it approached the most.

"This adds to the numerous facts which apprise us that the animals of the ancient world were all different from those we now see on the earth: for it is scarcely probable that if this animal still existed, so remarkable a species would have hitherto escaped the researches of the naturalists. It is also a new and very strong proof of the invincible laws of the subordination of characters, and the justness of the consequences thereon deduced for the classification of organized bodies: and under both these views it is one of the most valuable discoveries which have for a long time been made in natural history."

MEGEN, a town of Dutch Brabant, seated on the Maese, 15 miles S.W. of Nimeguen. Lon. 5. 26 E Lat. 51. 49 N.

MEGESVAR, a town of Transylvania, capital of a county of the same name, remarkable for its good wines. It is seated on the river Kotel. Lon. 25. 20 E. Lat. 46. 50 N.

MEGIERS, a town of Transylvania, 28 miles N. of Hermanstadt. Lon. 24. 41 E. Lat. 46. 53 N.

MEGRIM. *s.* (from *hemicrany*.) Disorder of the head.

MEHEGAN (William Alexander), a French historian, but of Irish extraction, was born at Salle, in the Cevennes, in 1721. He wrote, 1. The Origin of the Guebres; 2. Considerations on the Revolutions of Arts; 3. The Origin and Progress of Idolatry; 4. A Picture of Modern History, which has been translated into English, and is the best of his works. He died in 1766.

MEHRAN, the principal of the channels into which the river Indus divides itself, near Tatta, in Hindustan Proper.

MEHUN-SUR-YEVRE, an ancient town of France, in the department of Cher. Here are ruins of a castle built by Charles VII, as a place of retirement; and here he starved himself, in the dread of being poisoned by his son,

afterwards Lewis XI. It is seated in a fertile plain, on the river Yevre, 10 miles N.W. of Bourges, and 105 S. of Paris. Lon. 2. 17 E. Lat. 47. 10 N.

MEHUN-SUR-LOIRE, a town of France, in the department of Loiret, seated on the Loire, 10 miles S.W. of Orleans. Lon. 1. 48 E. Lat. 47. 50 N.

MEIBOMIUS (John Henry), professor of physic at Helmstadt, and first physician at Lubec. He wrote a work entitled Mæcenas, sive de C. Cilnii Mæcenatis Vita, Moribus et Rebus gestis, 1653. He died in 1655, aged 65.

MEIBOMIUS (Henry), son of the above, was born at Lubec in 1638, and educated at the university of Helmstadt, where in 1664 he obtained a professorship. He died in 1700. He wrote several medical works, and published, in three vols. folio, Scriptores Rerum Germanicarum.

MEIBOMIUS (Marcus), a learned man of the same family as the preceding, who published, in 1652, a Collection of seven Greek authors, with a Latin version by himself. He also wrote a treatise on Ancient Music, and some other works. He died in 1710.

MEIBOMIUS'S GLANDS. In anatomy, the small glands which are situated between the conjunctive membrane of the eyelid; first discovered by the elder Meibomius.

MEINAU, an island in the bay of the Bodmer Sea, or middle lake of Constance, one mile in circumference. It belongs to the knights of the Teutonic order, and produces excellent wine, which forms the chief revenue of the commander. It is five miles N. of Constance.

MEIER (George Frederic), a German writer, born in Saxony in 1718. He wrote wholly in German, not learning any other language. His principal works are, 1. Instructions how one may become a Modern Philosopher; 2. Introduction to the elegant Arts and Sciences. He died in 1777.

To MEINE. *v. a.* To mingle (*Ainsworth*).

MEINUNGEN, a town of Franconia, situate amid mountains, on the river Werra, 14 miles N.W. of Hilburghausen, and 21 N. of Schweinfurt. Lon. 10. 26 E. Lat. 50. 36 N.

ME'INY. *s.* (menigu, Saxon). A retinue; domestic servants (*Shakespeare*).

MEISSAU, a town of the archduchy of Austria, 14 miles S.S.W. of Znaim, and 34 N.W. of Vienna. Lon. 16. 7 E. Lat. 48. 30 N.

MEISSEN, or MISNIA, a margravate of Germany, in the electorate of Saxony, 100 miles long and 80 broad; bounded on the N. by the duchy of Saxony, on the E. by Lusatia, on the S. by Bohemia, and on the W. by Thuringia. It is a very fine country, producing corn, wine, metals, and all the conveniencies of life. The inhabitants speak the purest language in Germany. The capital is Dresden.

MEISSENHEIM, a town of Germany, in the duchy of Deux Ponts, situate on the Glan, 20 miles N. of Deux Ponts, and 30 W.S.W. of Mentz. Lon. 7. 22 E. Lat. 49. 42 N.

MEL. (*mel*). See HONEY.

MEL ACETATUM. Honey of vinegar. This preparation of honey and vinegar possesses aperient and expectorating virtues, and is given, with these intentions, in the cure of humoral asthma, and other diseases of the chest.

MEL ROSÆ. Honey of roses, an admirable preparation for the base of various gargles and collutories. It may also be employed with advantage, mixed with extract of bark or other medicines, for children who have a natural disgust to medicines.

MEL SCILLÆ. Honey of squills. Aperient, expectorant, and detergent virtues, are attributed to the honey of squills.

MELA (Pomponius), an old Latin writer, was a native of Spain, and flourished A.D. 45. His geographical work, entitled, De Situ Orbis, is extant, and was published by Isaac Vossius in 1658, 4to. James Gronovius also gave an edition of this valuable work in the same year, 12mo.

MELÆNA. (*melæna*, μελαινα, from μελας, black.) In medicine, the black vomit. Black bile.

MELALINCA, in botany, a genus of the class polyadelphia, order polyandria. Calyx five-parted, half superior; petals five; filaments numerous, united into five bodies; style one; capsule half-inverted by the calyx; three-celled. Twelve species; the greater number with alternate leaves, a few with opposite; almost all plants of Australasia, a few of India: the chief is M. leucadendron. Cajeput or Caja-puti-tree. Leaves alternate, lanceolate, pointed, oblique in a falcate manner, five-nerved; branchlets and petioles glabrous. It is a native of the East Indies, with a black trunk, and white leaves and branches; flowers sessile. From it is distilled the green aromatic oil, known by the name of cajeput or caju-puti; for which see the article CAJEPUT.

MELAMPO'DIUM. Black hellebore. In botany, a genus of the class syngenesia, order polygamia necessaria. Receptacle chaffy, conic; seeds crowned with a heart-shaped, involute converging scale; calyx five-leaved. Three species; natives of the West Indies and South America. The plant, under the name of helleborus niger, is still an article in many dispensatories. See HELLEBORUS NIGER.

MELAMPUS, in fabulous history, a celebrated soothsayer and physician of Argos, son of Amythaon and Idomenea, or Dorippe. He lived at Pylos, in Peloponnesus, and received his prophetic knowledge from two young serpents, as he lay asleep. Apollo also instructed him in the art of medicine, and he cured the daughters of Prœtus with hellebore (See PRŒTIDES). He also obtained the oxen of Iphiclus for his brother Bias, who thereby obtained in marriage Pero, the daughter of Neleus. This he did by teaching Iphiclus how to become a father. A severe distemper, which had rendered the women of Argos insane, was totally removed by Melampus, and Anaxagorus, who then sat on the throne, rewarded his merit, by giving him part of his kingdom, where he es-

stablished himself, and where his posterity reigned during six successive generations. He received divine honours after death, and temples were raised to his memory.

MELAMPYRUM. Cow wheat. In botany, a genus of the class didynamia, order angiospermia. Calyx tubular, four-cleft; upper lip of the corol compressed, with the margin turned back; capsule two-celled, oblique, opening at one edge; seeds two, gibbous. Seven species: one a native of Carolina, the rest European plants; of which four are common to the woods or corn-fields of our own country: and yield an excellent food for cattle, though they are apt to give a bitter taste to the butter made from their milk afterwards.

MELANAGOGES. (from μελας, black, and αγω, to expel). Medicines which purge off black bile.

MELANCHO'LIA. (*melancholia*, μελαγχολια, from μελας, black, and χολη, bile; because the ancients supposed that it proceeded from a redundance of black bile). Melancholy madness. A disease in the class neuroses and order vesaniæ of Cullen, characterized by erroneous judgment, but not merely respecting health, from imaginary perceptions or recollections influencing the conduct, and depressing the mind with ill-grounded fears; not combined with either pyrexia or comatose affections; often appearing without dyspepsia, yet attended with costiveness, chiefly in persons of rigid fibres and torpid insensibility. See MEDICINE.

MELANCHO'LIC. *a.* (from *melancholy*). 1. Disordered with melancholy; fanciful; hypochondrical; gloomy (*Clarendon*). 2. Unhappy; unfortunate (*Clarendon*).

ME'LANCHOLY. *s.* (from μελανος and χολη.) 1. A kind of madness, in which the mind is always fixed on one object (*Shakspeare*). 2. A gloomy, pensive, discontented temper (*Taylor*).

ME'LANCHOLY. *a.* (*melancholique*, Fr.) 1. Gloomy; dismal (*Denham*). 2. Diseased with melancholy; fanciful; habitually dejected (*Locke*.)

MELANCHOLY THISTLE. See CARDUUS.

MELANCHOLY TREE. See NYCTANTHES.

MELANCTHON (Philip), born at Bretten in the Palatinate, in 1495, was one of the wisest and most able men of his age among the reformers, though of a mild temper, and disposed to accommodate rather than to inflame disputes. In his youth he made an admirable progress in learning, and was made Greek professor at Wirtemberg in 1509. Here his lectures upon Homer, and the Greek text of St. Paul's Epistle to Titus, drew to him a great number of auditors, and entirely effaced the contempt to which his low stature and mean appearance had exposed him. Melancthon reduced the sciences to systems; and acquired such reputation, that he had sometimes 2500 auditors. He soon entered into an intimate friendship with Luther, who taught divinity in the same university; and in 1519 they went together to Leipsic, to dispute with Eccius. The following years he was continually engaged in various employments; he composed several books; he taught divinity; took several journeys in order to found colleges and visit churches; and in 1530 drew up a confession of faith, which goes by the name of the Confession of Augsburg, because it was presented to the emperor at the diet held in that city. All Europe was convinced that he was not, like Luther, backward to accommodate the differences between the various sects of Christians. He hated religious disputes, and was drawn into them only through the necessity of the part he was called to act in the world; and therefore would have sacrificed many things to have produced an union among the protestants. For this reason, Francis I. the French king, wrote to desire him to come and confer with the doctors of the Sorbonne, in order to agree with them about putting an end to all controversies; but though Luther endeavoured to persuade the elector of Saxony to consent to that journey, and though Melancthon himself desired it, that prince, whether he distrusted Melancthon's moderation, or was afraid of quarrelling with the emperor Charles V. would never grant his permission. The king of England also in vain desired to see him. Melancthon, in 1529, assisted at the conferences of Spires. In 1541 he was at the famous conferences at Ratisbon. In 1543 he went to meet the archbishop of Cologn to assist him in introducing the reformation into his diocese: but that project came to nothing; and in 1548 he assisted at seven conferences on the subject of the Interim of Charles V. and wrote a censure on that Interim and all the writings presented at these conferences. He was extremely affected at the dissensions raised by Flaccus Illyricus. His last conference with those of the Roman communion was at Worms in 1557. He died at Wittemburg in 1560, and was interred near Luther. Some days before he died he wrote upon a piece of paper the reasons which made him look upon death as a happiness; and the chief of them was, that it "delivered him from theological persecutions." Nature had given Melancthon a peaceable temper, which was but ill suited to the time he was to live in. His moderation served only to be his cross. He was like a lamb in the midst of wolves. Nobody liked his mildness; it looked as if he was lukewarm; and even Luther himself was sometimes angry at it.

Melancthon was a man in whom many good as well as great qualities were wonderfully united. He had great parts, great learning, great sweetness of temper, moderation, contentedness, and the like, which would have made him very happy in any other times than those in which he lived. He never affected dignities, or honours, or riches, but was rather negligent of all these things; too much so in the opinion of some, considering he had a family: and his son-in-law Sabinus, who was of a more ambitious make, was actually at variance with

him upon this very article. Learning was infinitely obliged to him on many accounts; on none more than this, that, as already observed, he reduced almost all the sciences, which had been taught before in a vague irregular manner, into systems. Considering the distractions of his life, and the infinity of disputes and tumults in which he was engaged, it is astonishing how he could find leisure to write so many books. Their number is prodigious, insomuch that it was thought necessary to publish a chronological catalogue of them in the year 1582. His works indeed are not correct, and he himself owned it; but as he found them useful, he chose rather to print a great number than to finish only a few; "which however (as Bayle says), was postponing his own glory to the advantage of others." His constitution was very weak, and required great tenderness and management; which made Luther, as hot and zealous as he was, blame him for labouring too earnestly in the vineyard.

MELANIPPUS, a son of Astapus, one of the Theban chiefs who defended the gates of Thebes against the army of Adrastus, king of Argos. He was opposed by Tydeus, whom he slightly wounded. He was killed by Amphiaraus, who carried his head to Tydeus. Tydeus, to take revenge of the wound he had received, bit the head with such barbarity, that he swallowed the brains, and Minerva, offended with his conduct, took away the herb which she had given him to cure his wound, and he died.—2. A son of Mars, who became enamoured of Cometho, a priestess of Diana Triclaria. He concealed himself in the temple, and ravished his mistress, for which violation of the sanctity of the place, the two lovers soon after perished by a sudden death.

MELANOPIPER. See Piper nigrum.

MELANTHIUM, in botany, a genus of the class hexandria, order trigynia. Calyx-less; corol three-petalled; filaments from the elongated claws of the corol. Fourteen species, chiefly natives of the Cape; a few of North America; one of Siberia.

MELANTHIUS, Melanthes, or Melanthius, a son of Andropompus. He was driven from his paternal kingdom by the Heraclidæ, and came to Athens, where Thymœtes resigned the crown to him, provided he fought a battle against Xanthus, a general of the Bœotians. He fought and conquered, and his family, surnamed the Meleidæ, sat on the throne of Athens, till the age of Codrus.

MELAS. (*melas*, from μελας, black.) Vitiligo nigra. Morphæa nigra. Lepra maculosa nigra. A disease that appears upon the skin in black or brown spots, which very frequently penetrate deep, even to the bone, and do not give any pain or uneasiness. It is very frequent in, and endemial to, Arabia, where it is supposed to be produced by a peculiar miasm.

MELASIS, in entomology, a Fabrician tribe of the genus Hispa, which see.

MELASMA. (*melasma*, μελασμος, from μελας, black). Melasmus. A disease that appears not unfrequently upon the tibia of aged persons, in form of a livid black spot, which, in a day or two, degenerates into a very foul ulcer.

MELASSES. See Treacle.

MELASTOMA. American gooseberry. In botany, a genus of the class decandria, order monogynia. Calyx five-cleft, campanulate; petals five, inserted into the calyx; berry five-celled, covered with the calyx. Eighty-five species; nearly all natives of the West Indies or America; a few of India. Shrubs with leaves beautifully variegated with gold, white, yellow, and russet colour; on which account several species are introduced into our greenhouses, and propagated by cuttings, which succeeds better than by seeds. They may be thus subdivided:

A. With twelve stamens.
B. With ten stamens; leaves doubly nerved.
C. With ten stamens; leaves trifly nerved.
D. With ten stamens; leaves quintuply nerved.
E. With eight stamens; leaves trifly nerved
F. With eight stamens; leaves quintuply nerved.

MELAZZO, an ancient town of Natolia, with a bishop's see, and some curious monuments of antiquity. It is seated on a bay of the Archipelago, 60 miles S. of Smyrna. Lon. 27. 25 E. Lat. 37. 28 N.

MELCHISEDEC, or Melchizedek, king of Salem, and priest of the Most High. The scripture tells us nothing either of his father, or of his mother, or of his genealogy, or of his birth, or of his death. And in this sense he was a figure of Jesus Christ, as St. Paul affirms, who is a priest for ever, according to the order of Melchisedec, and not according to the order of Aaron, whose original, life, and death, are known. When Abraham returned from pursuing the four confederate kings, who had defeated the kings of Sodom and Gomorrah, and had taken away Lot, Abraham's nephew, along with them, Gen. xiv. 17, 18, 19, &c., Melchisedec came to meet Abraham as far as the valley of Shaveh, which was afterwards named the king's valley, presented him with the refreshment of bread and wine, (or he offered bread and wine in sacrifice to the Lord; for he was a priest of the most high God), and blessed him. Abraham, being desirous to acknowledge him in the quality of priest of the Lord, offered him the tythes of all he had taken from the enemy. After this time there is no mention made of the person of Melchisedec; only the Psalmist, (cx. 4.) speaking of the Messiah, says, "Thou art a priest for ever after the order of Melchisedec." St. Paul, in his Epistle to the Hebrews, unfolds the mystery which is concealed in what is said of Melchisedec in the Old Testament. See Heb. v. 6.—10.

MELCHITES, in ecclesiastical history, were those Christians in Syria, Egypt, and the Levant, who, in the seventh century, though not Greeks, followed the doctrines and ceremonies of the Greek church. They were

called *melechites*, i. e. royalists, from the Hebrew *melech*, king, by their adversaries, by way of reproach, on account of their implicit submission to the edict of the emperor Marcian, in favour of the council of Chalcedon, For the same reason the emperor Justinian had the epithet Chalcedonensis given him.

MELCHIZEDECHIANS, or MELCHISEDEKIANS, ancient sectaries, so called, because they raised Melchizedec above all creatures, and even above Jesus Christ.

The author of this sect was one Theodotus; whence the Melchizedechians become more commonly known by the name of Theodotians; all the difference between those and the strict Theodotians consisting in that particular article relating to Melchizedech, who, according to them, was the great and supreme virtue.

MELCOMB-REGIS, a seaport town of England, in the county of Dorset, situated at the mouth of the river Wey, which parts it from Weymouth. It is a borough town, and sends two members to the British parliament, which privilege it had before Weymouth. It was appointed a staple, in the reign of Edward III., and in the next reign the French burnt it, and it was thereby rendered so desolate a place, that the remaining inhabitants prayed, and obtained a discharge from customs. On account of its quarrels with Weymouth, in the reign of Henry VI., its privileges as a port were removed to Pool; but in that of queen Elizabeth they were restored to it by act of parliament, which was confirmed in the next reign, on condition that Melcomb and Weymouth should make but one corporation, and enjoy their privileges in common; and to this was owing the flourishing state of both. In the two reigns last mentioned a wooden bridge with seventeen arches was built from hence to Weymouth; to which, as well as its church, the chief contributors were certain citizens of London; and upon its decay it was rebuilt in 1770. Here is a good market-place and town-hall, to which the members of the corporation of Weymouth come to attend public business, as the inhabitants do to its church for public worship. For several years past the sea has retired from it on the east, the priory formerly being bounded by the sea; but there is now a street beyond it, from which it is several paces to the high-water mark. The priory was situated in the east part of the town, in Maiden-street, whose site occupied about an acre, now covered with tenements. On the south side are the remains of the chapel, now converted into a malt-house. Near it are the remains of an ancient building, formerly a nunnery. Here are three meeting-houses, and a work-house for the poor. The church, which is in the middle of the town, has a wooden turret for a bell, and had been an old chapel. It was rebuilt in 1605, and made parochial, and is a handsome fabric, with a beautiful altar-piece painted and given by sir James Thornhill. The port, which generally goes by the name of Weymouth, is said to be the best frequented in the county, and is defended by Sandford and Portland castles. The markets for both towns are Tuesdays and Fridays, but there are no fairs. Melcomb-Regis is reckoned bigger, more thriving and populous than Weymouth. They are both but one corporation and borough, consisting of a mayor, recorder, two bailiffs, an uncertain number of aldermen, and twenty-four capital burgesses. Whoever has been a mayor is ever after an alderman. They send four burgesses to parliament, who are elected by such as have freeholds, whether they inhabit here or not; and the number of voters is near 700. Every elector, as in London, has the privilege of voting for four persons, who when chosen are returned, in two distinct indentures, as the burgesses of Weymouth and the burgesses of Melcomb-Regis.

MELEAGER, in fabulous history, a celebrated hero of antiquity, son of Œneus, king of Ætolia. The Parcæ were present at the moment of his birth, and predicted his future greatness. Atropos declared he should live as long as a firebrand then on the fire remained unconsumed. Althæa, his mother, no sooner heard this, than she snatched the stick from the fire, and kept it with the most jealous care. Meleager signalized himself in the Argonautic expedition, and afterwards delivered his country from the neighbouring inhabitants; but what contributed most to his glory was, his killing the celebrated Caledonian boar, which laid waste all the country. Several, however, of the princes and chiefs of Greece assisted at this hunt, so remarkable in ancient mythology. The conqueror gave the skin and the head to Atalanta, who had first wounded the animal. This irritated Toxeus and Plexippus, the brothers of Althæa, and they endeavoured to rob Atalanta of the present. Meleager defended a woman, of whom he was enamoured, and killed his uncles in the attempt. Mean time Althæa was going to the temple of the gods to return thanks for the victory which her son had gained, and in her way met the corpses of her brothers, and at this mournful spectacle she filled the whole city with her lamentations. Being then informed that they had been killed by Meleager, she, in the moment of resentment, threw into the fire the fatal stick, on which her son's life depended, and Meleager died as soon as it was consumed. 2. There were many others of this name, the most remarkable of whom is a Greek poet in the reign of Seleucus, the last of the Seleucidæ. He was born at Tyre, and died at Cos. It is to his well-directed labours that we are indebted for the *anthologia*, or collection of Greek epigrams, which he selected from forty-six of the best and most esteemed poets.

MELEAGRIDES, the sisters of Meleager, daughters of Œneus and Althæa. They were so disconsolate at the death of their brother Meleager, that they refused all aliments, and were, at the point of death, changed into birds

called Meleagrides. The youngest of the sisters Gorge and Dejanira, who had been married, escaped this metamorphosis.

MELEAGRIS. Turkey. In zoology, a genus of the class aves, order gallinæ. Bill conic, incurvate; head covered with spongy caruncles; chin with a longitudinal, membranous caruncle; tail broad, expansile; legs spurred. Two species.

1. M. gallipavo. Common turkey. Front and chin carunculate; breast of the male tufted; female spurless. Inhabits America; above three feet and a half long; is domesticated every where, and varies much in its colours: in a wild state lives in woods, and feeds on nuts, acorns, and various insects; roosts on the highest trees, is very irascible, and impatient of any thing red: the cock struts with an inflated breast, expanded tail, red face, and relaxed frontal caruncle, and makes an extraordinary internal noise, which, while uttered, shakes the whole body: eggs numerous, white, with reddish or yellow spots; tail-feathers eighteen.

It has been doubted by some ornithologists whether this bird be of American origin. Buffon, however, seems to have settled the question. Indeed the vast numbers which were found to people the forests of that continent when first discovered afford a strong presumption in favour of this opinion. Dulestre observes, that they were then also observed in prodigious abundance in the West-Indies, where, without any care, they produced three broods every year; a strong proof of their being in their native country, where all animals are most thriving and prolific. Among the Ilinois, the Jesuits affirm that they were seen in flocks of two hundred, and of such a large size that they weighed from thirty to forty pounds. It is farther remarkable, that in America the turkies swarm every where in their wild state; preserving, however, a sufficient distance from the settlements of the European colonists who have begun to occupy that country.

To this evidence, resulting from the abundance of these birds in America, we may add that of all those travellers who have visited Asia, who unanimously agree that they are very rare upon that continent. Chardin and Tavernier, who have travelled over all the East, positively assert that there is none of them in that vast country, except those that have been imported by Europeans; and that where they have been introduced by strangers they have seldom thriven. This is nearly the state of the case with regard to the turkeys that are found on different parts of the African coast. They were first imported thither, along with the common poultry, by the Portuguese; and have since been reared by the other nations who have made settlements on that continent.

No ancient writer, nor any naturalist of modern times, has mentioned turkeys till after the discovery of America; a circumstance from which we may fairly infer, that, till that great event, these birds were unknown in every other part of the world. Into England they were not introduced till the reign of Henry VIII.; a period which corresponds exactly with that in which they might be supposed to be imported by some of the first adventurers from the new world. The turkey, therefore, is a native of America; and, being a bird of heavy flight, it is probable that, without the assistance of man, it could never have made its way into any part of the ancient continent.

The turkey has been supposed a bastard progeny from the peacock and common poultry, from the name *gallo pavo*, that was originally given it when introduced into Europe. This opinion is altogether overthrown, if it be admitted that its origin has been in America; for thither the common cock never made his way till conveyed by the Europeans. The peacock also being of Persian extraction, could not, otherwise, have found his way thither.

The turkey, in its wild state, is characterized by the same stupidity that attends it in captivity. The wild ones are about twice the size of our domestic turkey; and their flesh is said to be harder and tougher. As this bird has been a much shorter period in domestication, so its varieties are greatly fewer. The tufted kind seems only a variety of the common turkey, with hardly any peculiarity, excepting the large crest of feathers above the head.

This genus has been domesticated almost as universally as the common poultry since the discovery of America; but before that period it was altogether unknown in the old world. The turkey was first introduced into Britain and France about the year 1521, immediately after the conquest of Mexico by Cortes. Ælian mentions a bird found in India that some writers have supposed to be the turkey; but those who are acquainted with that country universally agree that this genus is no where found wild in that part of the world. The distinguishing characteristics of this genus are, the naked and tuberous flesh which covers the head, and part of the neck; and a long fleshy appendage which hangs from the base of the upper mandible, and which is capable of great distension when the bird is under any agitation. There are several varieties of the turkey, which are probably constantly increasing in number by domestication. In their wild state turkeys are much larger, more hardy, and beautiful, than in captivity. The turkey, which with us is so tender when young, multiplies abundantly in the large forests of Canada, which a great part of the year are covered with snow. There it is generally of a dark grey colour, and its feathers are elegantly bordered at the edges with a bright yellow. In almost every part of America and the West-Indies turkies are found wild, and in such abundance that they constitute a great part of the food of the natives, although never reduced by them into a state of domestication. Their feathers are woven into cloaks, fans, and um-

brellas: but the improvident savages never think of taking into keeping a bird from which they might be supplied with plenty on every emergency. They seem to take a delight in precarious possession: and, as a great part of the pleasure of the chase lies in the uncertainty of the pursuit, they are unwilling to abridge those labours, which they deem equally honourable and delightful. Hunting the turkey is, therefore, one of the principal amusements of the savage; as its flesh constitutes often the chief support of his family. The manner in which he hunts it is this: he is supplied with a faithful rough dog, supposed to be the wolf domesticated; and when, by the assistance of this guide, he discovers a flock, the dog is immediately dispatched in pursuit. At first the turkeys merely by running far outstrip the dog, who nevertheless continues the pursuit, knowing from experience that they are incapable of running for any length of time at full speed. Accordingly, he soon overtakes them, when, already exhausted with fatigue, they take the trees for shelter: there they perch, incapable of flying farther, till they are, one after another, knocked down with a stick. Such is their stupidity, that when an European comes upon a flock of them in the woods, and kills one by discharging his piece, the rest seldom take their flight till a great number be destroyed.

The turkey is not so fertile, or so powerfully influenced by the sexual passion, as the common cock: he has, accordingly, less courage, and less jealousy. Four or five females are sufficient for one male. If more be placed together, they will indeed fight; but not with the same violence or effect as the common cock, who has often been observed to attack the turkey, though twice his size, and to put an end to his life. Nor are subjects of quarrel wanting to incense these different species against each other: for it is asserted that the turkey-cock, when deprived of his females, will apply to the common hens.

2. M. satyra. Horned turkey. Head with two horns; body red, with eye-like spots: nostrils, front, and area of the eyes covered with black, hair-like feathers; horns callous, blue, bent back; caruncle of the chin dilatable, blue, varied with rufous; legs whitish, spurred; tail-feathers twenty. Female: head covered with feathers, hornless, and without gular caruncle; feathers of the head and upper part of the neck black-blue, long, decumbent; rest of the body, as in the male, red, with eye-like spots; spurs more obtuse. Inhabits India: something less than the common turkey.

MELES. In zoology. See URSUS.

MELESETIS, a river of Asia Minor, in Ionia, near Smyrna. Some of the ancients supposed that Homer was born on its banks, from which circumstance they call him Melesigenes, and his compositions Meletææ chartæ. It is even supported that he composed his poems in a cave near the source of that river.

MELIA. Bead-tree. In botany, a genus of the class decandria, order monogynia. Calyx five-toothed, petals five; nectary cylindric, toothed, bearing the anthers in its throat; drupe with a five-celled nut. Four species; three natives of India, one of Jamaica. The species most worthy of notice is M. azedarach; leaves doubly pinnate, with about five smooth leaflets; an indigenous tree of Syria and Ceylon, rising about twenty feet high, with nuts that are bored and strung for beads by the Catholics. The pulp surrounding the nuts is poisonous.

MELIANTHUS. Locust. Honey-flower. In botany, a genus of the class didynamia; order angiospermia. Calyx five-leaved; the lower leaflet gibbous; petals four, with the nectary beneath the lowest; capsule four-celled. Three species: all Cape shrubs, with alternate, unequally-pinnate leaves on a winged petiole; flowers in spikes, tinged with green, saffron-colour and red: the leaves and flowers are highly beautiful, and worthy of cultivation in our conservatories. They flower in June; and are best propagated by cuttings or layers, the seeds seldom maturating in England. M. major, if shaken while in flower, discharges a shower of nectar.

ME'LICA. Melic-grass, rope-grass. In botany, a genus of the class triandria; order digynia. Calyx two-valved, mostly two-flowered, with an imperfect flower between them; corol two-valved. Nine species; natives of Europe, the Cape, or South America: three common to the woods, mountains, or bogs of our own country. Some writers make the species more numerous, but it is only by admitting several which more properly belong to the genus EHRHARTA, which see. The species most worthy of notice is M. nutans, with beardless petals, contracted panicle, pointing one way, nearly simple; flowers pendulous; calyx two-flowered. It grows wild on our mountains, and is employed in the Hebrides as a material for ropes for fishing-nets, as the fibres will long remain in the water without rotting.

MELICERIS. (μελικηρις, a tumor, or abscess, inclosed in a cystis, consisting of matter not unlike honey; whence its name.) The meliceris is otherwise called atheroma. It gathers without pain, and gives way upon pressure, but returns again: it is to be cured by warm discutients.

MELICERTA, in fabulous history, a son of Athamas and Ino, was saved by his mother from the fury of his father, who prepared to dash him against a wall, as he had done his brother Learchus. The mother was so terrified that she threw herself into the sea, with Melicerta in her arms. Neptune had compassion on the misfortunes of Ino and her son, and changed them into sea deities. Ino was called Leucothoe, or Matuta, and Melicerta was known among the Greeks by the name of Palæmon, and among the Latins by that of Portumnus.

MELICO'CCA. In botany, a genus of the class octandria, order monogynia. Calyx four-parted; petals four, reflected beneath the

calyx; stigma somewhat peltate; drupe covered with a bark. One species: a branched tree of South America, with terminal racemes.

MELI'COPE. In botany, a genus of the class octandria, order monogynia. Calyx four-parted; corol four-petalled; nectary four double glands surrounding the germs; capsules four, one-seeded. One species: a native of Polynesia.

MELI'CYTUS. In botany, a genus of the class diœcia, order pentandria. Calyx five-toothed; petals five; nectaries five scales. Male: filaments fixed to the inside of the nectary. Female: stigma flat, four or five-lobed; capsule berried, one-celled; seeds imbedded in the pulp. One species: a native of New Zealand.

MELIDA, an island in the Adriatic, by many supposed to be the island in which St. Paul landed in his voyage to Rome, and where he was bitten by a viper: thirty-two miles long and four wide Lon. 35. 30 E. Lat. 43. 5 N.

MELILOT. In botany, a name for the trifolium indicum of Linnéus. See TRIFOLIUM and MELILOTUS.

MELILOTUS. (*melilotus*, μελιλωτος, from μελι, honey, and λωτος, the lotus, so called from its smell, being like that of honey.) *Locus sylvestris. Trifolium odoratum* Melilot. This plant, *trifolium melilotus officinalis* of Linnéus, has been said to be resolvent, emollient, anodyne, and to participate of the virtues of camomile. Its taste is unpleasant, subacrid, subsaline, but not bitter; when fresh it has scarcely any smell; in drying it acquires a pretty strong one of the aromatic kind, but not agreeable. The principal use of melilot has been in clysters, fomentations, and other external applications.

MELINDA, a kingdom on the east coast of Africa, situated, according to some, between the third and fourth degree of south latitude; though there is great disagreement among geographers as to its extent. It is allowed by all, however, that the coasts are very dangerous; being full of rocks and shelves, and the sea at some seasons very liable to tempests. The kingdom of Melinda is for the most part rich and fertile; producing almost all the necessaries of life except wheat and rice, both which are brought thither from Cambaya and other parts; and those who cannot purchase them make use of potatoes in their stead, which are here fine, large, and in great plenty. They likewise abound with great variety of fruit-trees, roots, plants, and other esculents, and with melons of exquisite taste. They have also great plenty of venison, game, oxen, sheep, hens, geese, and other poultry, &c. and one breed of sheep, whose tails weigh between 30 and 40 pounds. The capital city is also called Melinda. It is seated at the mouth of the Quilmanci. Lon. 39. 38 E. Lat. 2. 15 S.

To ME'LIORATE. *v. a.* (*meliorer*, Fr. from *melior*, Latin.) To better; to improve (*South*).

MELIORA'TION. *s.* (*melioration*, Fr.) Improvement; act of bettering (*Bacon*).

MELIO'RITY. *s.* (from *melior*, Latin.) State of being better (*Bacon.*)

MELISSA, a daughter of Melissus, king of Crete, who, with her sister Amalthæa, fed Jupiter with the milk of goats. She first found out the means of collecting honey, whence some have imagined that she was changed into a bee, as her name is the Greek word for that insect. 2. One of the Oceanides, who married Inachus, by whom she had Phoroneus and Ægialeus.

MELISSA. Balm, or baum. In botany, a genus of the class didynamia, gymnospermia. Calyx dry, flattish above; the upper lip somewhat flat-topped; corol with the upper lip slightly vaulted, cloven; lower lip with the middle of the lobe heart-shaped. Five species, all natives of the South of Europe: the two following are the chief.

1. M. officinalis. Common balm. Whorls reaching half way round; bractes oblong, pedicelled; leaves ovate, acute, serrate; flowers whitish. In its recent state it has a roughish aromatic taste, and a pleasant lemon-like odour. It was formerly much esteemed in nervous diseases, hysteric and hypocondriacal affections; but at present it is only used as a grateful diluent tea in fevers, and other inflammatory affections.

2. M. cretica. Calaminth. Racemes terminal; peduncles solitary, very short. Under the name of calamintha this plant is still an article in some dispensatories. See CALAMINTHA.

MELISSUS of Samos, a Greek philosopher, was the son of Rhagines and the disciple of Parmenides; and lived about 440 B. C. He pretended that the universe is infinite, immoveable, and without a vacuum. Themistocles was among his pupils.

MELITE, or MELITA, (anc. geog.), an island referred to Africa by Scylax and Ptolemy; but nearer Sicily, and allotted to it by the Romans: commended for its commodious harbours; for a city well built, with artificers of every kind, especially weavers of fine linen; all owing to the Phœnicians the first colonists.

It was for a long time supposed by Christians in general, and is still believed by the inhabitants of Malta, and would be heresy to say any thing else in that place, that Malta is the island which in the 27th chapter of the Acts of the Apostles is called Melita. But this is a mistake. The island is in the Adriatic sea, on the coast of Dalmatia, and now known by the name of Melida. That Paul was shipwrecked on this island appears, 1st. From the nature of the wind by which the ship was driven; and which was a south-east wind. 2dly, From the words of Luke, "As we were driven up and down in Adria." 3dly, From the nature of the coast. It was sandy, and of gradual ascent, which description is found to correspond with the coast of Melida but not of Malta. 4thly, From the nature of the in-

habitants. They were barbarians. But this could not well be said of Malta; an island colonized by Greeks and Romans. 5thly, From the natural history of the island. Vipers have been found in Melida, but not in Malta. So that Melida corresponds to the scriptural account in every particular, and Malta not in any. For if Malta be the island on which Paul was shipwrecked, he must have been driven southward by a south-east wind; or the Adriatic sea must be in the Mediterranean; the ship must have struck in the cleft of a rock; the inhabitants of an island colonized by Greeks and Romans must have been barbarians; and the Apostle must have been bit by a viper in an island where there was no viper to bite him.

MELITTIS. Bastard balm. In botany, a genus of the class didynamia, order gymnospermia. Calyx unequal, wider than the tube of the corol; corol with the upper lip flat; lower lip three-lobed, crenate; anthers cohering crosswise. Three species; one a native of Japan, two of the woods of England.

MELITUS, a poet and orator of Athens, of mean and insidious character, who became one of the principal accusers of Socrates. He, together with the other accusers, were afterwards condemned and put to death.

To MELL. *v. n.* (*meler*, French.) To mix; to meddle. (Obsolete).

MELLI'FEROUS. *a.* Productive of honey.

MELLIFICA'TION. *s.* (*mellifico*, Latin.) The art or practice of making honey (*Arb.*).

MELLI'FLUENCE. *s.* (*mel* and *fluo*, Lat.) A honied flow; a flow of sweetness.

MELLI'FLUENT. MELLI'FLUOUS. *a.* (*mel* and *fluo*, Latin.) Flowing with honey (*Shakspeare*).

MELLINGEN, a town of Switzerland, in the bailiwic of Baden, which, since 1712, depends on the cantons of Zuric and Bern. It is seated in a fertile country, on the river Reuss, five miles S. by W. of Baden.

MELLINUS, in the entomology of Fabricius, a tribe of the genus VESPER, which see.

MELLITES. Mellite. Mellilite. Honeystone. Mullat of alumina. Honeystein. (*Wern.*) In mineralogy, a genus of the class inflammables. Soft, brittle, pellucid, shining with a glossy lustre, of a conchoidal texture, and honey-yellow colour; in the form of a double four-sided pyramid with the faces quite smooth. Found near Arturn in Saxony, between layers of wood-coal, and in Switzerland imbedded in asphalt; in colour, texture, and transparency resembling the honey-yellow amber, from which it principally differs in crystallizing as above; when heated it whitens, and burns in the open air without odour, and without being sensibly charged, leaving a white residuum which at first has no taste, but at length produces an acid impression on the tongue: fracture conchoidal, or indeterminate; specific gravity 1.666.

MELLOW. *a.* (meampa, soft, Saxon.) 1. Soft with ripeness; full ripe (*Digby*). 2. Soft in sound (*Dryden*). 3. Soft; unctuous (*Bacon*). 4. Drunk; melted down with drink (*Roscommon*).

To ME'LLOW. *v. a.* (from the adjective.) 1. To ripen; to mature; to soften by ripeness; to ripen by age (*Addison*). 2. To soften (*Mort.*). 3. To mature to perfection (*Dryd.*).

To ME'LLOW. *v. n.* To be matured; to ripen (*Donne*).

ME'LLOWNESS. *s.* (from *mellow.*) 1. Maturity of fruits; ripeness; softness by maturity (*Digby*). 2. Maturity; full age.

MELMOTH (William, Esq.), a learned and worthy bencher of Lincoln's Inn, was born in 1666. In conjunction with Mr. Peere Williams, Mr. Melmoth was the publisher of Vernon's Reports, under an order of the court of chancery. He had once an intention of printing his own Reports; and a short time before his death advertised them at the end of those of his coadjutor Peere Williams, as then actually preparing for the press. They have, however, not yet made their appearance. But the performance for which he justly deserves to be held in perpetual remembrance is, The Great Importance of a Religious Life; concerning which it may be mentioned, to the credit of the age, that notwithstanding many large editions had before been circulated, 42,000 copies of this useful treatise have been sold in the last 20 years. It is a somewhat singular circumstance, that the real author of this most admirable treatise should never before have been publicly known (it having been commonly attributed to the first earl of Egmont, and particularly by Mr. Walpole in his catalogue); which is the more surprising, as the author is plainly pointed out in the following short character prefixed to the book itself: "It may add weight, perhaps, to the reflections contained in the following pages, to inform the reader, that the author's life was one uniform exemplar of those precepts which, with so generous a zeal, and such an elegant and affecting simplicity of style, he endeavours to recommend to general practice. He died on the 6th day of April 1743, and lies buried under the cloister of Lincoln's Inn chapel. MEM. PAT. OPT. MER. FIL. DIC." The son, by whom his character has been drawn, is William Melmoth, Esq. the translator of Pliny and of Cicero's Letters; and author of those which pass under the name of sir Thomas Fitzosborne.

MELOCHIA. Jew's mallow. Calyx often double; petals five, spreading; filaments subulate; styles five; capsule five-celled, one-seeded. Fourteen species: natives of the East or West Indies. The chief species is M. corchorifolia, with sessile flowers in heads; roundish capsules; leaves somewhat cordate, slightly lobed. It is a native of India and Palestine: and is a common pot-herb among the Jews of the latter country.

MELODI'NUS. In botany, a genus of the class pentandria, order digynia. Corol twisted, with the throat crowned; berry two-

celled, many-seeded. One species only, a scandent shrub of Australasia, nearly resembling a Rauwolfia.

MELO'DIOUS. *a.* (from *melody.*) Musical; harmonious (*Milton*).

MELO'DIOUSLY. *ad.* (from *melodious.*) Musically; harmoniously.

MELO'DIOUSNESS. *s.* (from *melodious.*) Harmoniousness; musicalness.

MELODY. (μελωδια, compounded of μελι, *honey*, and ωδη, *singing.*) In music, is the agreeable effect of different musical sounds, ranged or disposed in a proper succession.

Melody is the effect only of one single part, voice, or instrument; by which it is distinguished from harmony; though in common speech, these two are frequently confounded.

Harmony is properly the agreeable result of the union of two or more concording musical sounds heard in consonance, *i. e.* at one and the same time; so that harmony is the effect of two parts at least: as therefore a continued succession of musical sounds produces melody, so does a continued combination of these produce harmony.

MELOE. Blossom-eater. In zoology, a genus of the class insecta; order coleoptera. Antennas moniliform; thorax roundish; head inflected, gibbous; shells soft, flexile. Thirty-six species; four of them common to our own country, the rest distributed over the globe. They may be thus subdivided:

A. Wingless: shells abbreviated.

B. Winged; shells as long as the abdomen.

α. Jaw horny, bifid; containing twenty-six species, and constituting the tribe Mylabris of Fabricius.

β. Jaw linear, entire; containing four species; and comprising the Cercroma of Fabricius.

The following are chiefly worthy of notice:

1. M. proscarabæus; oil-beetle. Entirely blue-black or dark-violet; head broad; thorax narrower than the head; shells very short and oval; abdomen long; the female thrice as large as the male. A native of Europe; and frequently found in the middle of spring in our own fields and pastures creeping slowly, the body appearing so distended with eggs as to cause the insect to move with difficulty. When touched it exudes a yellowish moisture from its pores, which was formerly celebrated for its supposed efficacy in rheumatic pains, applied to the parts affected with the disease in the form of an embrocation.

2. M. variegatus. Dull green; thorax edged with red; shells punctured; antennas purple; body large, above variegated with red, green, and copper, beneath and legs purple. Inhabits Europe.

The officinal cantharis, or Spanish-fly, was, till of late, supposed to be a meloe, and is now generally so arranged in our pharmacopœias: minuter observation, however, has established it to be a LYTTA, under which name it will be found described.

MELOLONTHA, in the Fabrician system of entomology, a tribe of the genus scarabæus, or beetle. See SCARABÆUS.

MELON. In botany. See CUCUMIS.

MELON-WATER. See CUCURBITA and CITRULLUS.

MELON-THISTLE. See CACTUS.

MELOPE'PO. In botany. See CUCURBITA.

MELOPŒIA. (Greek.) A term in the ancient music signifying the art, or rules, of composition in melody. Aristides Quintilian divides the melopœia into three kinds: the hypatoides, so called from the gravity of the sounds to which it was confined; the mesoides, consisting of the middle sounds; and the netoides, formed of the acute sounds. These were again divisible into other kinds, or distinctions; as the erotic, or amorous; the comic; and the encomiastic: also into the systaltic, or mournful, tender, and affecting strain; the diastaltic, or noble, bold, and exhilarating air; and the euchastic, which was between these, and calculated to calm and assuage the passions.

MELOS (anc. geog.), an island between Crete and Peloponnesus, about 24 miles from Scyllæum. It is about 60 miles in circumference, and of an oblong figure. It enjoyed its independence for about 700 years before the time of the Peloponnesian war. This island was originally peopled by a Lacedemonian colony, 1116 years before the Christian era. For this reason the inhabitants refused to join the rest of the islands and the Athenians against the Peloponnesians. This refusal was severely punished. The Athenians took Melos, and put to the sword all such as were able to bear arms. The women and children were made slaves, and the island left desolate. An Athenian colony repeopled it, till Lysander reconquered it and re-established the original inhabitants in their possessions.

MELOTHRIA. In botany, a genus of the class triandria, order monogynia. Calyx five-cleft; corol campanulate, one-petalled; berry three-celled, many-seeded. One species: a native plant of America, with creeping roots, striking out afresh at every joint. The flowers are melon-shaped, but small, of a pale yellow colour; they are succeeded by a fruit of the size of a pea, which when ripe is black; before which time they are often pickled by the inhabitants. With us it is a stove-plant, and the fruit is much smaller.

MELPOMENE, in fabulous history, one of the Muses, daughter of Jupiter and Mnemosyne. She presided over tragedy. Horace has addressed the finest of his odes to her, as to the patroness of lyric poetry. She was generally represented as a young woman with a serious countenance. Her garments were splendid, she wore a buskin, and held a dagger in one hand, and in the other a sceptre and crown.

MELROSE, a town of Scotland, in the county of Selkirk, and on the confines of Tweeddale, seated on the south side of the river

Tweed; with an ancient abbey now in ruins. W. lon. 2. 42. N. lat. 55. 38. This abbey was founded by king David I. in 1136. He peopled it with Cistertians brought from Rivale abbey in Yorkshire, and dedicated it to the Virgin Mary. At the Reformation James Douglas was appointed commendator, who took down much of the building, in order to furnish materials for a large house to himself, which still remains, and is dated 1590. Nothing is left of the abbey excepting a part of the cloister walls elegantly carved; but the ruins of the church are of most uncommon beauty. Part is at present used for divine service, the rest uncovered; but every part does great honour to the architect.—Alexander II. was buried beneath the great altar, and it is also the place of interment of the Douglases and other potent families.—Its situation is extremely pleasant.

MELT. *s.* A name given to the spleen of some animals.

To MELT. *v. a.* (meltan, Saxon.) 1. To dissolve; to make liquid (*Locke*). 2. To dissolve; to break in pieces (*Burnet*). 3. To soften to love or tenderness (*Addison*). 4. To waste away (*Shakspeare*).

To MELT. *v. n.* 1. To become liquid; to dissolve (*Dryden*). 2. To be softened to pity, or any gentle passion; to grow tender, mild, or gentle (*Shakspeare*). 3. To be dissolved; to lose substance (*Shakspeare*). 4. To be subdued by affliction (*Psalms*).

ME'LTER. *s.* One that melts metals (*Sid.*).

ME'LTINGLY. *ad.* (from *melting*.) Like something melting (*Sidney*).

MELTON-MOWBRAY, a town of Leicestershire, 108 miles from London. It is a large well-built place, in a fertile soil; with a market on Tuesday, the most considerable for cattle of any in this part of the island. It is almost encompassed with a little river called the Eye, over which it has two fine bridges; and has a large handsome church, with a free-school. Here are frequent horse-races, and three fairs in the year. Lon. 0. 50 W. Lat. 52. 48 N.

MELUN, an ancient town of France, in the department of Seine and Marne, seated on the Seine, 25 miles SE. of Paris. Lon. 2. 35 E. Lat. 48. 30 N.

MELUNDY. See SUNDERDOO.

MELYRIS. In zoology, a genus of the class insecta, order coleoptera. Antennas entirely perfoliate; head inflected under the thorax; thorax margined; lip clavate, emarginate; jaw one-toothed, pointed. Three species; one, M. viridi, green, shells rough, with three raised lines, black antennas, and small round sentel, a native of the Cape. The habitation of the other two unknown; they have only been seen as dried specimens in museums.

ME'MBER. *s.* (*membre*, Fr. *membrum*, Latin.) 1. A limb; a part appendant to the body. 2. A part of a discourse or period; a head; a clause (*Watts*). 3. Any part of an integral (*Addison*). 4. One of a community (*Addison*).

MEMBRACIS, in the Fabrician system of entomology, a tribe of the genus CICADA, which see.

MEMBRA'NA HYALOIDEA. Membrana arachnoidea. In anatomy, the transparent membrane which includes the vitreous humour of the eye.

MEMBRA'NA PUPILLA'RIS. In anatomy, a very delicate membrane of a thin and vascular texture, and an ash colour, arising from the internal margin of the iris, and totally covering the pupil in a fœtus of six months.

MEMBRA'NA RUYSCHIA'NA. The celebrated anatomist Ruysch discovered that the choroid membrane of the eye was composed of two laminæ. He gave the name of membrana ruyschiana to the internal lamina, leaving the old name of choroides to the external.

MEMBRA'NA TY'MPANI. The membrane covering the cavity of the tympanum, and separating it from the meatus auditorius externus. It is of an oval form, convex below the middle, towards the hollow of the tympanum, and concave towards the meatus auditorius, and convex above the middle towards the meatus, and concave towards the hollow of the tympanum. According to the observations of anatomists, it consists of six laminæ; the first and most external is a production of the epidermis, the second is a production of the skin lining the auditory passage: the third is cellular membrane, in which the vessels form an elegant net-work; the fourth is shining, thin, and transparent, arising from the periosteum of the meatus; the fifth is cellular membrane, with a plexus of vessels like the third; and the sixth lamina, which is the innermost, comes from the periosteum of the cavity of the tympanum. This membrane, thus composed of several laminæ, has lately been discovered to possess muscular fibres.

MEMBRANA'CEOUS. In botany, of the substance of parchment. A membranaceous stipule; as in arenaria rubra. Membranaceous valvule. Membranaceous calyx, petiole; flatted like the leaf itself. Membranaceous leaf: having no distinguishable pulp between the two surfaces.

MEMBRANALOGIA. (*membranalogia*, from *membrana*, a membrane, and λογος, a discourse.) Membranology. The doctrine of the common integuments and membranes. This word is a bad compound; being formed of two distinct languages.

MEMBRANATE, in botany, applied to the stem. A membraned stem. Complanatus more folii. Flattened like a leaf.

MEMBRANE. (*membrana.*) A thin expanded substance, composed of cellular texture, whose elastic fibres are so arranged and woven together, as to allow of great pliability. The membranes of the body are various, as the skin, peritoneum, pleura, dura mater, &c. &c.

MEMECYLON, in botany, a genus of the class octandria; order monogynia. Calyx superior, with a striate bottom, and very entire margin; corol four petalled; anthers inserted into the side of the tip of the filament; berry

crowned with a cylindrical calyx. Five species; all trees of India.

MEMEL, a strong town of Eastern Prussia, with a castle, the finest harbour in the Baltic, and an extensive commerce. It is seated on the N. extremity of the Curische Haf, an inlet of the Baltic 70 miles in length, which is here joined to the sea by a narrow strait. On the N.E. side of the entrance into the harbour is a lighthouse, erected in 1796. It is 76 miles N.N.E. of Konigsberg, and 140 N.E. of Dantzic. Lon. 21. 40 E. Lat. 55. 46 N.

MEME'NTO. *s.* (Lat.) A memorial notice; a hint to awaken the memory (*Bacon*).

MEMMINGEN, a strong town of Suabia, near which, in 1795, the French republicans defeated the emigrants under the prince of Conde. It is seated in a fertile plain, 24 miles S.E. of Ulm, and 35 S.W. of Augsburg. Lon. 10. 16 E. Lat. 48. 3 N.

MEMMIUS, a Roman knight, who rendered himself illustrious for his eloquence and poetical talents. He was accused of extortion in his province, and banished by Julius Cæsar, though Cicero undertook his defence. Lucretius dedicated his poem to him.—2. A Roman who accused Jugurtha, before the Roman people. The Mummii were descended, according to some accounts, from Mnestheus, the friend of Æneas.

MEMNON, a king of Æthiopia, son of Tithonus and Aurora. He came with a body of 10,000 men to assist his uncle Priam during the Trojan war, where he behaved with great courage, and killed Antilochus, Nestor's son. The aged father challenged the Æthiopian monarch, but Memnon refused it on account of the venerable age of Nestor, and accepted that of Achilles. He was killed in the combat in the sight of the Grecian and Trojan armies. Memnon was the inventor of the alphabet, according to Anticlides, a writer mentioned by Pliny.—2. A general of the Persian forces, when Alexander invaded Asia. He distinguished himself for his attachment to the interest of Darius, his valour in the field, the soundness of his counsels, and his great sagacity. He defended Miletus against Alexander, and died in the midst of his successful enterprizes, B.C. 333.

MEMO'IR. *s.* (*memoire*, French.) 1. An account of transactions familiarly written (*Prior*). 2. Hint; notice; account of any thing (*Arbuthnot*).

ME'MORABLE. *a.* (*memorabilis*, Latin.) Worthy of memory; not to be forgotten (*Dry.*).

ME'MORABLY. *ad.* (from *memorable.*) In a manner worthy of memory.

MEMORA'NDUM. *s.* (Latin.) A note to help the memory (*Swift*).

MEMO'RIAL. *a.* (*memorialis*, Latin.) 1. Preservative of memory (*Broome*). 2. Contained in memory (*Watts*).

MEMO'RIAL. *s.* 1. A monument; something to preserve memory (*South*). 2. Hint to assist the memory (*Hayward*). 3. An address, reminding of services and soliciting reward.

MEMO'RIALIST. *s.* (from *memorial.*) One who writes memorials (*Spectator*).

To MEMORI'ZE. *v. a.* (from *memory.*) 1. To record; to commit to memory by writing (*Wot.*). 2. To cause to be remembered (*Shak.*).

ME'MORY. *s.* (*memoria*, Latin.) 1. The power of retaining or recollecting things past; retention; reminiscence; recollection (*Locke*). 2. Exemption from oblivion (*Shakspeare*). 3. Time of knowledge (*Milton*). 4. Memorial; monumental record (*Addison*). 5. Reflection; attention: not in use (*Shak.*).

When we remember with little or no effort, it is called remembrance simply, or memory, and sometimes passive memory. When we endeavour to remember what does not immediately and (as it were) of itself occur, it is called active memory, or recollection. A ready recollection of our knowledge, at the moment when we have occasion for it, is a talent of the greatest importance. The man possessed of it seldom fails to distinguish himself in whatever sort of business he may be engaged. It is indeed evident, that when the power of retention is weak, all attempts at eminence of knowledge must be vain; for "memory is the primary and fundamental power, without which there could be no other intellectual operation. Judgment and ratiocination suppose something already known, and draw their decisions only from experience. Imagination selects ideas from the treasures of remembrance, and produces novelty only by varied combinations. We do not even form conjectures of distant, or anticipations of future, events, but by concluding what is possible from what is past."

Memory, says Mr. Locke, is, as it were, the storehouse of our ideas: for the narrow mind of man not being capable of having many ideas under view at once, it was necessary to have a repository in which to lay up those ideas which it may afterwards require. But our ideas, being nothing but actual perceptions in the mind, which cease to be any thing when there is no perception of them; this laying up our ideas in the repository of the memory, signifies no more than this; that the mind has a power, in many cases, to revive perceptions it has once had, with this additional perception annexed to them, that it has had them before. And it is by the assistance of this faculty, that we are said to have all those ideas in our understandings which we can bring in sight, and make the objects of our thoughts, without the help of those sensible qualities which first imprinted them there.

Attention and repetition help much to the fixing ideas in our memories: but those which make the deepest and most lasting impressions are those which are accompanied with pleasure and pain. Ideas but once taken in and never again repeated, are soon lost; as those of colours in such as lost their sight when very young.

The memory of some men is tenacious almost to a miracle; but yet there seems to be a constant decay of all our ideas, even of those which are struck deepest; and in minds the most re-

tentive; so that if they be not sometimes renewed, the print wears out, and at last there remains nothing to be seen.

Those ideas that are often refreshed by a frequent return of the objects or actions that produce them, fix themselves best in the memory, and remain longest there: such are the original qualities of bodies, viz. solidity, extension, figure, motion, &c. and those that almost constantly affect us, as heat and cold.

In memory, the mind is oftentimes more than barely passive; for it often sets itself on work to search some hidden ideas; sometimes they start of their own accord; and sometimes tempestuous passions tumble them out of their cells. This faculty other animals seem to have to a great degree, as well as men, as appears by birds learning tunes, and their endeavour to strike the notes right. For it seems impossible that they should endeavour to conform their voices (as it is plain they do) to notes whereof they have no idea.

Of a faculty so important, many rules have been given for the regulation and improvement; of which the first is, that he who wishes to have a clear and distinct remembrance, should be temperate with respect to eating, drinking, and sleep. The memory depends very much upon the state of the brain; and therefore whatever is hurtful to the latter, must be prejudicial to the former. Too much sleep clouds the brain, and too little overheats it; therefore either of these extremes must of course hurt the memory, and ought carefully to be avoided. Intemperance of all kinds, and excess of passion, have the same ill effects; so that we rarely meet with an intemperate person whose memory is at once clear and tenacious.

Doubtless, the most effectual way to gain a good memory is by constant and moderate exercise of it; for the memory, like other habits, is strengthened and improved by daily use. It is indeed hardly credible to what a degree both active and passive remembrance may be improved by long practice. Scaliger reports of himself, that in his youth he could repeat above 100 verses, having once read them; and Berthicus declares, that he wrote his Comment upon Claudian without consulting the text. To hope, however, for such degrees of memory as these, would be equally vain as to hope for the strength of Hercules, or the swiftness of Achilles. "But there are clergymen who can get a sermon by heart in two hours, though their memory, when they began to exercise it, was rather weak than strong: and pleaders, with other orators who speak in public and extempore, often discover, in calling instantly to mind all the knowledge necessary on the present occasion, and every thing of importance that may have been advanced in the course of a long debate, such powers of retention and recollection as, to the man who has never been obliged to exert himself in the same manner, are altogether astonishing. As habits, in order to be strong, must be formed in early life, the memories of children should therefore be constantly exercised; but to oblige them to commit to memory what they do not understand, perverts their faculties, and gives them a dislike to learning." In a word, those who have most occasion for memory, as orators and public speakers, should not suffer it to lie idle, but constantly employ it in treasuring up and frequently reviving such things as may be of most importance to them; for, by these means, it will be more at their command, and they may place greater confidence in it upon any emergency.

"Men complain of nothing more frequently (says Beattie) than of deficient memory; and indeed every one finds, that, after all his efforts, many of the ideas which he desired to retain have slipped irretrievably away; that acquisitions of the mind are sometimes equally fugitive with the gifts of fortune; and that a short intermission of attention more certainly lessens knowledge than impairs an estate. To assist this weakness of our nature, many methods besides those which we have mentioned have been proposed; all of which may be justly suspected of being ineffectual: for no art of memory, however its effects may have been boasted or admired, has been ever adopted into general use; nor have those who possessed it appeared to excel others in readiness of recollection or multiplicity of attainments." The reader who is desirous to try the effect of those helps, may have recourse to a treatise entitled A new Method of artificial Memory; but the true method of memory is attention and exercise.

Simonides is said to have been the first who found out the art of memory. His method was by a choice of places and images, as a repository of ideas; such, for instance, as a large house divided into several apartments, rooms, closets, &c. All these, and their order, were to be rendered extremely familiar to the imagination and memory. Then, whatever was to be remembered, was by some symbolical representation or another, as an anchor for navigation, to be connected with some part of the house, or other artificial repository, in a regular manner. Cicero and Quintilian give us some account of this method, and speak of it with respect. Several moderns have attempted improvements of artificial memory. There was a collection of various treatises of this kind published at Leipsic; this and Bruxius's Simonides Redivivus, are commended by Morhof. Paschius gives us some account also of several authors who have treated of this art. It is certainly of use in history and chronology. The chief artifice, in this respect, is to form an artificial word, the letters of which shall signify numbers. Hence a date or æra may more easily be recapitulated and remembered than without such a contrivance. This invention is mentioned as a secret known to few, by Paschius. It has been prosecuted lately in England, by Dr. Grey.

The method is this: to remember any thing in history, chronology, geography, &c. a word is formed, the beginning whereof being the first syllable or syllables of the thing to be remembered, does, by frequent repetition, of course draw after it the latter parts, which is so con-

trived as to give the answer. Thus, in history, the deluge happened in the year before Christ 2348. This may be signified by the word Dél *étok*; Del standing for deluge, and *etok* for 2348. How these words come to signify these things, or contribute to the remembering them, is now to be shewn.

The first thing to be done, is to learn exactly the following series of vowels and consonants, which are to represent the numerical figures, so as to be able at pleasure to form a technical word, which shall stand for any number, or to resolve a word already formed into the number it stands for.

a	*e*	*i*	*o*	*u*	*au*	*oi*	*ei*	*ou*	*y*
1	2	3	4	5	6	7	8	9	0
b	*d*	*t*	*f*	*l*	*s*	*p*	*k*	*n*	*z*

Here *a* and *b* stand for 1, *e* and *d* for 2, *i* and *t* for 3, and so on. These letters are assigned arbitrarily to the respective figures, and may very easily be remembered. The first five vowels in order naturally represent 1, 2, 3, 4, 5. The diphthong *au*, being composed of *a*, 1, and *u*, 5, stands for 6; *oi* for 7, being composed of *o*, 4 and *i*, 3; *ou* for 9, being composed of *o*, 4, and *u*, 5: The diphthong *ei* will easily be remembered for 8, being the initials of the word. In like manner for the consonants, where the initials could be conveniently be retained, they are made use of to signify the number, as *t* for 3, *f* for 4, *s* for 6, and *n* for 9. The rest were assigned without any particular reason, unless that possibly *p* may be more easily remembered for 7, or *septem*, *k* for 8, or ὀκτώ, *d* for 2, or *duo*; *b* for 1, as being the first consonant, and *l* for 5, being the Roman letter for 50, than any others that could have been put in their places. Mem. Techn. p. 2, 3. It is further to be observed, that *z* and *y* being made use of to represent the cypher, where many cyphers meet together, as 1000, 1000000, &c. instead of a repetition of *azyzyzy*, &c. let *g* stand for 100, *th* for a thousand, and *m* for a million. Thus *ag* will be 100, *ig* 300; *oug* 900, &c. *ath* 1000, *am* 1000000, *loum* 59000000, &c. Ib. p. 5. Fractions may be set down in the following manner: let *r* signify the line separating the numerator and denominator, the first coming *before*, the other *after* it; as *iro* $\frac{3}{4}$, *urp* $\frac{5}{7}$, *pourag* $\frac{71}{100}$, &c. When the numerator is 1 or unit, it need not be expressed, but begin the fraction with *r*; as *re* $\frac{1}{2}$, *ri* $\frac{1}{3}$, *ro* $\frac{1}{4}$, &c. So in decimals, *rag* $\frac{1}{100}$, *rath* $\frac{1}{1000}$. Ibid.

This is the principal part of the method, which consists in expressing numbers by artificial words. The application to history and chronology is also performed by artificial words. The art herein consists in making such a change in the ending of the name of a place, person, planet, coin, &c. without altering the beginning of it, as shall readily suggest the thing sought, at the same time that the beginning of the word, being preserved, shall be a leading or prompting syllable to the ending of it so changed. Thus in order to remember the years in which Cyrus, Alexander, and Julius Cæsar, founded their respective monarchies, the following word may be formed; for Cyrus, Cyr*uts*; for Alexander, Alex*ita*; for Julius Cæsar, Juli*os*. *Uts* signifies, according to the powers assigned to the letters before mentioned, 536; *ita* is 331, and *os* is 46. Hence it will be easy to remember, that the empire of Cyrus was founded 536 years before Christ, that of Alexander 331, and that of Julius Cæsar, 46. Mem. Techn. Introd. p. viii. and ix.

For the farther application of this method, we refer to the ingenious author of the last cited book. We shall only add, that technical verses contribute much to the assistance of the memory, both as they generally contain a great deal in a little compass, and also because, being once learned, they are seldom or never forgot. The author before quoted has given us several specimens of such verses in history, chronology, geography, and astronomy, as also the Jewish, Grecian and Roman coins, weights and measures, &c. He advises his reader to form the words and verses for his own use himself; as he perhaps will better remember them than those formed by the author.

Be this as it will, we shall here give his table of the kings of England since the conquest; where one thousand being added to the italics in each word, expresses the year when they began their reigns. Thus,

Will con*sau*, Ruf*koi*, Hen*rag*.
Steph*bil* & Hensec*buf*, Rich*bein*, J*ann*, Heth*das*, & Ed*doid*.
Edse*typ*, Edter*tes*, Rise*toip*, Hefo*toun*, Hefi*fud*que.
Hensi*fed*, Edquar*fauz*, Efi Ro*kt*, Hensep*feil*, Henoc*lyn*.
Edsex*los*, Mary*lut*, Els*luk*, Jam*syd*, Caroprim*sel*.
Carsec*sok*, Jam*seif*, Wil*seik*, An*pyb*, Geo*bo-doi-sy*.

As to Simonides' method, Quintilian says he will not deny it to be of some use; for instance, in repeating a multitude of words in the order they occur, and in things of this nature: but he thinks it of less use in getting by heart a continued oration, and in this respect rather an incumbrance. He himself advises, if the speech to be remembered be long, to get it by heart in parts, and those not very small. The partition ought chiefly to be made according to the different topics. He thinks it best to get things by heart tacitly, and if, the better to fix the attention, the words be pronounced, yet it should be in a low voice. Apt divisions help the memory greatly. But after all, the great art of memory is exercise; to get many things by heart, and daily, if possible. Nothing increases more by use, or suffers more by neglect, than the memory. At whatever age a man aims at the improvement of this faculty, he should patiently submit to the uneasy labour of repeating what he has read or written. Here, as in other cases, where habits are to be acquired, exercise should be increased by degrees. Quint. Inst. Orat. lib. xi. cap. 2. p. 989.

Lord Bacon enumerates several helps to memory, as order, artificial place, verse, whatever brings an intellectual thing to strike the senses, and those things which make an impression by

means of a strong passion, as fear, surprise, &c. Those things also sink deepest, and dwell longest in the memory, which are impressed upon a clear mind unprejudiced either before or after the impression, as the things we learn in childhood, or think of just before going to sleep; as likewise the first times things are taken notice of.

A multitude of circumstances also, or, as it were, handles or holds to be taken, help the memory; as the making many breaks in writing, reading or repeating aloud: but as to this last, see Quintilian's opinion before mentioned. Those things which are expected, and raise the attention, stick better than such as pass slightly over the mind; whence if a man reads any writing twenty times over, he will not remember it so well as if he read it but ten times with trying between whiles to repeat it, and consulting the copy where his memory failed.

MEMPHIS, a celebrated town of Egypt, on the western banks of the Nile, above the Delta, so called from a nymph, one of the daughters of the Nile. It once contained many beautiful temples, particularly those of the god Apis. (See Apis.) It was in the neighbourhood of Memphis that those famous pyramids were built, whose grandeur and beauty still astonish the modern traveller. The place where Memphis formerly stood is not now known; the ruins of its former grandeur were conveyed to Alexandria, to beautify its palaces, or to adorn the neighbouring cities.

MEN. The plural of *man*.

MEN-PLEASER. *s.* (*men* and *pleaser*.) One too careful to please others (*Ephesians*).

MEN. (Ital.) The abbreviation of *Meno*, Less: as *Men allegro*, Less quick: *Men presto*, Less rapid.

To ME'NACE. *v. a.* (*menacer*, French.) To threaten; to threat (*Shakspeare*).

ME'NACE. *s.* (*menace*, French.) Threat (*Brown*).

ME'NACER. *s.* (*menaceur*, French.) A threatener; one that threats (*Phillips*).

MENA'CHANITE, in mineralogy. See Titanium.

MENAGE (Fr.), denotes a collection of animals; whence we have derived the word *menagerie*, or *menagery*.

MENAGE (Giles), in Latin *Ægidius*, a celebrated French writer, born at Angers in 1613. He finished his studies in that city, was made advocate, and pleaded for some time at Angers, Paris, and Poictiers; but, becoming at length disgusted with the bar, turned ecclesiastic, and gave himself up entirely to the study of polite literature. He at length entered into the family of the cardinal de Ritz; but disagreeing with some persons belonging to his eminence, went to live in the cloister of Notre Dame, where he held an assembly of learned men every Wednesday. He read a great deal; had a prodigious memory; and was incessantly quoting in his conversation verses in Greek, Latin, Italian, French, &c. on which account he was often turned into ridicule by the wits, especially towards the end of his days. His great memory he retained even in his old age: and, what is very rare, it returned to him after some interruption. The reputation of his works procured him a place in the academy della Crusca at Florence. He might have been a member of the French academy at its first institution, if it had not been for his Requeste des Dictionnaires: but when that was forgot, he was proposed in 1684 to fill up a vacant place in that academy, and was excluded only by the superior interest of his competitor Mr. Bergent; for there was not one member of all those who gave their votes against him but owned that he deserved the place. He would not suffer his friends to propose him again. He died at Paris in 1692, aged 79. He wrote a great number of books in prose and verse; the principal of which are, 1. Miscellaneous works. 2. The Origin of the French Language. 3. The Origin of the Italian Tongue; the best edition of which is that of Geneva, in 1685, folio. 4. An edition of Malherbe's Poems, with Notes. 5. An edition of Diogenes Laertius, with Observations. 6. Remarks on the French Tongue. 7. Greek, Latin, Italian, and French Poems.

MENAGOGUES. See Emmenagogues.

MENALIPPE, a sister of Antilope, queen of the Amazons, taken by Hercules when that hero made war against this celebrated nation. She was ransomed, and Hercules received in exchange the arms and belt of the queen. (*Juv.*)—A daughter of the centaur Chiron, beloved and ravished by Æolus, son of Helen. She retired into the woods to hide her disgrace, and when she had brought forth, she entreated the gods to remove her totally from the pursuits of Chiron. She was changed into a mare, and called Osyroe. She became a constellation after death, called the horse. (*Hygin.*)—Menalippe is a name common to other persons, but it is generally spelt Melanippe, by the best authors. (See Melanippe.)

MENANDER, a celebrated comic poet, of Athens, educated under Theophrastus. He was universally esteemed by the Greeks, and received the appellation of Prince of the New Comedy. His writings were replete with elegance, refined wit, and judicious observations. Of 108 comedies which he wrote, nothing remains but a few fragments. It is said that Menander drowned himself in the 52d year of his age, B. C. 293, because the compositions of his rival Philemon obtained more applause than his own.—There were many others of this name, but of inferior note. The fragments of Menander were first published by Morel in Greek, at Paris, A.D. 1553. The edition of Leclerc, published at Amsterdam, in 1709 and 1712, is full of blunders, which were severely criticised by Dr. Bentley.

MENCKE (Otto), a learned German, was born at Oldenburg in Westphalia in 1644. He became professor of morality at Leipsic, and rector of that university. He died in 1707. His most considerable work was the Acta Eruditorum of Leipsic, the first volume of which was entirely by him.

MENCKE (John Burcard), son of the preceding, was born at Leipsic in 1674. In 1699

he was made professor of history, and gained great reputation by his lectures. He died in 1732. His works are numerous, the chief of which is entitled De Charlataneria eruditorum declamationes duæ, 1715, 8vo. He continued the Acta Eruditorum, which had been begun by his father.

To MEND. *v. a.* (*emendo*, Latin.) To repair from breach or decay (*Chron.*). 2. To correct; to alter for the better (*Pope*). 3. To help; to advance (*Locke*). 4. To improve; to increase (*Dryden*).

To MEND. *v. n.* To grow better; to advance in any good (*Pope*).

ME'NDABLE. *a.* (from *mend.*) Capable of being mended.

MENDA'CITY. *s.* (from *mendax*, Latin.) Falsehood (*Brown*).

MENDE, an ancient town of France, capital of the department of Lozere, with a bishop's see. The fountains, and one of the steeples of the cathedral, are remarkable. It is very populous; has manufactures of serges and other woollen stuffs; and is seated on the Lot, 35 miles S.W. of Puy, and 210 S. by E. of Paris. Lon. 3. 35 E. Lat. 44. 31 N.

ME'NDER. *s.* (from *mend.*) One that makes any change for the better (*Shakspeare*).

MEN'DICANT. *a.* (*mendicans*, Lat.) Begging; poor to a state of beggary (*Fiddes*).

ME'NDICANT. *s.* (*mendicant*, French.) A beggar; one of some begging fraternity.

MENDICANTS, OF BEGGING FRIARS, several orders of religious in popish countries, who, having no settled revenues, are supported by the charitable contributions they receive from others. This sort of society began in the 13th century; and the members of it, by the tenor of their institution, were to remain entirely destitute of all fixed revenues and possessions; though in prosess of time their number became a very heavy tax upon the people. Innocent III. was the first of the popes who perceived the necessity of instituting such an order; and accordingly he gave such monastic societies, as made a profession of poverty, the most distinguishing marks of his protection and favour. They were also encouraged and patronized by the succeeding pontiffs, when experience had demonstrated their public and extensive usefulness. But when it became generally known that they had such a peculiar place in the esteem and protection of the rulers of the church, their number grew to such an enormous and unwieldy multitude, and swarmed so prodigiously in all the European provinces, that they became a burthen, not only to the people, but to the church itself. The great inconvenience that arose from the excessive multiplication of the mendicant orders was remedied by Gregory X. in a general council, which he assembled at Lyons in 1272. For here all the religious orders that had sprung up after the council held at Rome in 1215, under the pontificate of Innocent III. were suppressed; and the extravagant multitude of mendicants, as Gregory called them, were reduced to a smaller number, and confined to the four following societies or denominations, viz. the Dominicans, the Franciscans, the Carmelites, and the Augustins or hermits of St. Augustin.

As the pontiffs allowed these four mendicant orders the liberty of travelling wherever they thought proper, of conversing with persons of every rank, of instructing the youth and multitude wherever they went; and as those monks exhibited, in their outward appearance and manner of life, more striking marks of gravity and holiness than were observable in the other monastic societies, they arose all at once to the very summit of fame, and were regarded with the utmost esteem and veneration through all the countries of Europe. The enthusiastic attachment to these sanctimonious beggars went so far, that, as we learn from the most authentic records, several cities were divided or cantoned out into four parts, with a view to these four orders; the first part being assigned to the Dominicans, the second to the Franciscans, the third to the Carmelites, and the fourth to the Augustinians. The people were unwilling to receive the sacrament from any other hands than those of the mendicants, to whose churches they crowded to perform their devotions, while living, and were extremely desirous to deposit there also their remains after death.

To MENDICATE. *v. a.* (*mendico*, Latin; *mendier*, French.) To beg; to ask alms.

MENDI'CITY. *s.* (*mendicitas*, Lat.) The life of a beggar.

MENDIP-HILLS, a lofty tract, in the N.E. of Somersetshire, abounding in coal, calamine, and lead; the latter said to be of a harder quality than that of other countries. Copper, manganese, bole, and red ochre, are also found in these hills. On their summits are large swampy flats, dangerous to cross.

MENDLESHAM, a town in Suffolk, with a market on Friday, 18 miles E. of Bury St. Edmunds, and 82 N.E. of London. Lon. 1. 12 E. Lat. 52. 24 N.

MENDRAH, a province of the kingdom of Fezzan, much of which is a continued level of hard and barren soil; but the quantity of trona, a species of fossil alkali, that floats on the surface, or settles on the banks of its numerous smoking lakes, has given it a higher importance than that of the most fertile districts. It has a town of the same name, 60 miles S. of Mourzook.

MENDRISIO, a town of Swisserland, the capital of an Italian bailiwic, containing about 10,000 inhabitants. It is seven miles W. of Como. Lon. 8. 59 E. Lat. 25. 45 N.

MENDS, for *amends* (*Shakspeare*).

MENECRATES. The most remarkable of this name is a physician of Syracuse, famous for his vanity and arrogance. He crowned himself like the master of the gods, and in a letter which he wrote to Philip king of Macedon, he styled himself in these words, *Menecrates Jupiter to king Philip, greeting.* The Macedonian monarch answered, *Philip to Menecrates, greeting, and better sense.* Philip invited him to one of his feasts, but a table was put separate for the physician, on which

he was served only with perfumes and frankincense, like the father of the gods. He then remembered that he was a mortal. He lived about 300 years before the Christian æra.

MENEDEMUS, a Greek philosopher of the Cyrenaic sect, born in the island of Eubœa. He was held in high esteem among his countrymen for some time, but at length some persons, out of envy, prejudiced their minds against him on the false charge of his having formed the design of betraying the state. He died in the reign of Alexander the Great.

MENEDEMUS, a cynic philosopher, who lived at a later period than the preceding. He wore a long black gown, a scarlet girdle, a cap on his head whereon were represented the signs of the zodiac. In this fantastic dress he used to perambulate, pretending that he was commissioned by the infernal deities. Menippus was the disciple of this madman.

MENEHOULD (St.), an ancient and considerable town of France, in the department of Marne, with a castle advantageously situate; but its other fortifications have been demolished. It was almost totally destroyed by a conflagration in 1719. It was here, in 1792, that the French gave the first check to the progress of the victorious Prussians, which in the end compelled them to a retreat. St. Menehould is seated in a morass, on the river Aisne, between two rocks, 20 miles N.E. of Chalons, and 110 E. of Paris. Lon. 4. 59 E. Lat. 49. 2 N.

MENELAUS, a king of Sparta, brother to Agamemnon. His father's name was Atreus, according to Homer, or according to Hesiod, &c. he was the son of Plisthenes and Ærope. (See PLISTHENES.) He was educated with his brother Agamemnon in the house of Atreus, but soon after his death, Thyestes his brother usurped the kingdom, and banished the two children of Plisthenes. Menelaus and Agamemnon came to the court of Œneus, king of Calydonia, who treated them with paternal care. From Calydonia they went to Sparta, where, like the rest of the Grecian princes, they solicited the marriage of Helen, the daughter of king Tyndarus, who made choice of Menelaus. (See HELENA.) As soon as the nuptials were celebrated, Tyndarus resigned the crown to his son-in-law, and their happiness was complete. This was, however, of short duration, and the arrival of Paris in Sparta was the cause of great revolutions. (See PARIS.) Paris carried off Helen, and the Greek princes, mindful of their oath, took up arms to defend the cause of Menelaus. The combined forces assembled at Aulis in Bœotia, where they chose Agamemnon for their general, and Calchas for their high priest. They then marched to meet their enemies in the field. During the Trojan war, Menelaus behaved with great spirit and courage, and Paris must have fallen by his hand, had not Venus interposed, and redeemed him from certain death. In the tenth year of the Trojan war, Helen, by perfidiously introducing Menelaus into the chamber of Deiphobus, obtained his forgiveness, and she returned with him to Sparta, after a voyage of eight years. He died some time after his return.

MENES, the first king of Egypt. He built the town of Memphis, as it is generally supposed, and deserved, by his abilities and popularity, to be called a god after death.

MENESTEUS or MENESTHEUS, or MNESTHEUS, a son of Pereus, who so insinuated himself into the favour of the people of Athens, that during the long absence of Theseus, he was elected king. The lawful monarch, at his return home, was expelled, and Mnestheus established his usurpation by his popularity and great moderation. As he had been one of Helen's suitors, he went to the Trojan war at the head of the people of Athens, and died in his return in the island of Melos. He reigned 23 years, 1205 B. C. and was succeeded by Demophoon, the son of Theseus.

MENESTRAUDIE, or MINSTRELSY. (French.) The general name under which the successors of Philip-Augustus of France recalled and established those minstrels of Paris who had formed themselves into a company, but whom, on account of their irregularity and licentiousness of conduct, that prince had banished from the kingdom in the first year of his reign. The Menestraudie had a chief appointed over them called the King of the Minstrels.

MENGEN, a town of Germany, in Austrian Suabia, 33 miles SW. of Ulm, and 45 S. of Stutgard. Lon. 9. 13 E. Lat. 48. 1 N.

MENGS (Anthony Raphael), first painter to the king of Spain, was born at Aussig in Bohemia, A. D. 1728. His father, painter to Augustus III. king of Poland, perceiving his superior talents, carried him from Dresden to Rome in 1741. After having there pursued his art for four years, and copied the principal monuments of that capital, he returned to Dresden, where he executed different works for Augustus with very uncommon success. During his abode in Italy he became acquainted with Don Carlos king of Naples; and when this prince succeeded to the crown of Spain in 1761, he was careful to engage Mengs in his service, by granting him a yearly pension of 2000 doubloons, together with a house and equipage. He lived, however, chiefly at Rome; where, in 1779, he fell a sacrifice to his confidence in a German quack, who pretended to cure him of a disease which he had contracted partly by his intense application, and partly by grief for the loss of his wife. Mengs was an author as well as a painter, and his works, which chiefly relate to the fine arts, have been published in 2 vols. 4to. by the chevalier d'Azara. He combined the peculiar excellencies of Raphael, Correggio, and Titian.

ME'NIAL. *a.* (from *meiny*.) Belong to the retinue, or train of servants (*Dryden*).

ME'NIAL. *s.* One of the train of servants.

MENIAS. In botany, a genus of the class pentandria, order monogynia. Corol salver-shaped; calyx three-leaved; berry four-

celled; seeds solitary. One species: a South American herb, with alternate, ovate, entire, rough leaves.

MENIE. See MUNIA.

MENIN, a town of Austrian Flanders, seated on the Lis. In 1585, it was almost entirely destroyed by fire. It is considered as the key of the country; and in every war, from the middle of the 17th century, the possession of it has been deemed of the utmost consequence. It has therefore been often taken and retaken; the last time by the French in 1794, when the garrison (in order to save the unhappy emigrants) bravely forced their way through the enemy. It is eight miles SE. of Ypres, and 10 N. of Lisle. Lon. 3. 9 E. Lat. 50. 48 N.

MENINSKI or MENIN (Franciscus a Mesgnien), a learned orientalist, was born in Lorraine in 1623. He travelled to the East, and for his skill in the oriental languages was made counsellor of war to the emperor, and principal interpreter. He died at Vienna in 1698. His greatest work is entitled, Thesaurus Linguarum Orientalium, Vienna, 5 vols. folio, 1680, and 1687.

MENINX. (*meninx*, μηνιγξ, from μενω, to remain.) The Greek term for the membranes enveloping the brain. See DURA MATER and PIA MATER.

MENINX DURA. See DURA MATER.

MENIPPUS, a cynic philosopher, and the disciple of Menedemus, was born at Gadara in Palestine. He wrote some snarlish satires, for which reason writings of that stamp have been sometimes called Menippean.

MENI'SCIUM. In botany, a genus of the class cryptogamia, order filices. Fructification in nearly parallel lunules, with the veins of the frond intervening; involucreless. Two species; both exotics.

MENISCUS, a lens or glass, convex on one side, and concave on the other. Sometimes also called a lune or lunula. See DIOPTRICS.

To find the focus of a meniscus, the rule is, as the difference between the diameters of the convexity and concavity, is to either of them, so is the other diameter to the focal length, or distance of the focus from the meniscus. So that, having given the diameter of the convexity, it is easy to find that of the concavity, so as to remove the focus to any proposed distance from the meniscus. For, if D and d be the diameters of the two sides, and f the focal distance; then since,

by the rule $D-d : D :: d : f$,
therefore $d : D :: f-d : f$,
or $f-d : f :: d : D$.

Hence, if D the diameter of the concavity be double to d that of the convexity, f will be equal to D, or the focal distance equal to the diameter; and therefore the meniscus will be equivalent to a plano-convex lens.

Again, if $D=3d$, or the diameter of the concavity triple to that of the convexity, then will $f=\frac{1}{2}D$, or the focal distance equal to the radius of concavity; and therefore the meniscus will be equivalent to a lens equally convex on either side.

But if $D=5d$, then will $f=\frac{1}{4}D$; and therefore the meniscus will be equivalent to a sphere.

Lastly, if $D=d$, then will f be infinite; and therefore a ray falling parallel to the axis, will still continue parallel to it after refraction.

MENISPE'RMUM. Moon-seed. In botany, a genus of the class diœcia; order dodecandria. Petals four, exterior; eight interior. Male: stamens sixteen. Fem.: stamens eight, barren; berries two, one-seeded. Twelve species, natives of India chiefly; three of America. Of these the chief is M. cocculus—with cordate, retuse, mucronate leaves, and jagged stem. The berries are the common cocculus indicus of the shops, and are extremely intoxicating.

MENNONITES, a sect of Baptists, who were formerly prevalent in Holland; taking their rise in 1536, from one Menno Simon, a Romish priest.

MENŒCEUS, a young Theban, son of Creon. He offered himself to death for the Di Manes, when an oracle had ordered the Thebans to sacrifice one of the descendants of those who sprang from the dragon's teeth, and he killed himself near the cave where the dragon of Mars had formerly resided.

MENŒTES, the pilot of the ship of Gyas, at the naval games exhibited by Æneas at the anniversary of his father's death. He was thrown into the sea by Gyas for his inattention, and saved himself by swimming to a rock.

MENŒTIUS, a son of Actor and Ægina. He left his mother and went to Opus, where he had by Sthenele, Patroclus, often called from him Menœtiades. Menœtius was one of the Argonauts.

MENO'LOGY. *s.* (μηνολόγιον.) A register of months (*Stillingfleet*).

MENORRHA'GIA. (*menorrhagia*, μηνοῤῥαγια, from μηνια, the menses, and ῥηγνυμι, to break out.) An immoderate flow of the menses. A genus of disease in the class pyrexia and order hæmorrhagia of Cullen. Species, 1. Menorrhagia rubra, proper; from women neither with child nor in childbirth. 2. Menorrhagia alba, serous; the fluor albus; see LEUCORRHŒA. 3. Menorrhagia vitiorum, from some local disease. 4. Menorrhagia lochialis, from women after delivery. See LOCHIA.

ME'NOW. *s.* (commonly *minnow*.) A fish.

ME'NSAL. *a.* (*mensalis*, Latin.) Belonging to the table; transacted at table (*Clarissa*).

MENSES. See CATAMENIA and MENSTRUATION.

ME'NSTRUAL. *a.* (*menstruus*, Latin.) 1. Monthly; happening once a month; lasting a month (*Bentley*.) 2. Pertaining to a menstruum (*Bacon*).

MENSTRUATION. From the uterus of every healthy woman who is not pregnant, or who does not give suck, there is a discharge of a fluid resembling blood, at certain periods, from the time of puberty to the approach of

old age; and, from the periods or returns of this discharge, it is called menstruation. There are several exceptions to this definition. It is said that some women never menstruate; some menstruate while they continue to give suck; and others are said to menstruate during pregnancy: some are said to menstruate in early infancy, and others in old age; but such discharges, Dr. Denman is of opinion may, with more propriety, be called morbid, or symptomatic: but the definition is generally true.

At whatever time of life this discharge comes on, a woman is said to be at puberty: though of this it is a consequence, and not a cause. The early or late appearance of the menses may depend upon the climate, the constitution, the delicacy or hardness of living, and upon the manners of those with whom young women converse. In Greece and other hot countries girls begin to menstruate at eight, nine, and ten years of age; but, advancing to the northern climes, there is a gradual protraction of the time till we come to Lapland, where women do not menstruate till they arrive at maturer age, and then in small quantities, at long intervals, and sometimes only in the summer. But, if they do not menstruate according to the genius of the country, it is said they suffer equal inconveniences as in warmer climates, where the quantity discharged is much greater, and the periods shorter. In this country, girls begin to menstruate from the fourteenth to the eighteenth year of their age, and sometimes at a later period, without any signs of the disease; but if they are luxuriously educated, sleeping upon down beds, and sitting in hot rooms, menstruation usually commences at a more early period.

Many changes in the constitution and appearance of women are produced at the time of their first beginning to menstruate. Their complexion is improved, their countenance is more expressive and animated, their attitudes graceful, and their conversation more intelligent and agreeable; the tone of their voice becomes more harmonious, their whole frame, but particularly their breasts, are expanded and enlarged, and their minds are no longer engaged in childish pursuits and amusements.

Some girls begin to menstruate without any preceding indisposition; but there are generally appearances or symptoms which indicate the change that is about to take place. These are usually more severe at the first than in the succeeding periods: and they are similar to those produced by uterine irritation from other causes, as pains in the back and inferior extremities, complaints of the viscera, with various hysteric and nervous affections. These commence with the first disposition to menstruate, and continue till the discharge comes on, when they abate or disappear, returning, however, with considerable violence in some women, at every period during life. The quantity of blood discharged at each evacuation depends upon the climate, constitution, and manner of living; but it varies in different women in the same climate, or in the same woman at different periods; in this country it amounts to about five or six ounces.

There is also a great difference in the time required for the completion of each period of menstruation. In some women the discharge returns precisely to a day or an hour, and in others there is a variation of several days without inconvenience. In some it is finished in a few hours, and in others it continues from one to ten days, but the intermediate time, from three to six days, is the most usual.

There has been an opinion, probably derived from the Jewish legislator, afterwards adopted by the Arabian physicians, and credited in other countries, that the menstruous blood possessed some peculiar malignant properties. The severe regulations which have been made in some countries for the conduct of women at the time of menstruation, the expression used, Isaiah, chap. xxx. and Ezekiel, the disposal of the blood discharged, or of any thing contaminated with it, the complaints of women attributed to its retention, and the effects enumerated by grave writers, indicate the most dreadful apprehensions of its baneful influence. Under peculiar circumstances of health, or states of the uterus, or in hot climates, if the evacuation be slowly made, the menstruous blood may become more acrimonious or offensive than the common mass, or any other secretion from it: but in this country and age, no malignity is suspected, the menstruous woman mixes in society as at all other times, and there is no reason for thinking otherwise than that this discharge is of the most inoffensive nature.

At the approach of old age women cease to menstruate; but the time of cessation is commonly regulated by the original early or late appearances of the menses. With those who began to menstruate at ten or twelve years of age, the discharge will often cease before they arrive at forty; but if the first appearance was protracted to sixteen or eighteen years of age, independently of disease, such women may continue to menstruate till they have passed the fiftieth, or even approach the sixtieth year of their age. But the most frequent time of the cessation of the menses, in this country, is between the forty-fourth and forty-eighth year; after which women never bear children. By this constitutional regulation of the menses, the propagation of the species is in every country confined to the most vigorous part of life: and had it been otherwise, children might have become parents, and old women might have had children, when they were unable to supply them with proper or sufficient nourishment. See CATAMENIA and MIDWIFERY.

ME'NSTRUOUS. *a.* (*menstruus*, Latin.) 1. Having the catamenia (*Sandys*). 2. Happening to women at certain times (*Brown*).

ME'NSTRUUM. (*menstruum*.) Solvent. All liquors are so called, which are used as dissolvents, or to extract the virtues or ingredients by infusion, decoction, &c. The principal menstrua made use of in pharmacy are water,

vinous spirits, oils, acid, and alkaline liquors. Water is the menstruum of all salts, of vegetable gums, and of animal jellies. Of the first it dissolves only a determinate quantity, though of one kind of salt more than of another; and being thus saturated, leaves any additional quantity of the same salt untouched. It is never saturated with the two latter, but unites readily with any proportion of them, forming with different quantities, liquors of different consistencies. It takes up likewise, when assisted by trituration, the vegetable gummy resins, as ammoniacum and myrrh; the solutions of which, though imperfect, that is, not transparent, but turbid and of a milky hue, are nevertheless applicable to valuable purposes in medicine. Rectified spirit of wine is the menstruum of the essential oils and resins of vegetables; of the pure distilled oils of animals; and of soaps, though it does not act upon the expressed oil and fixed alkaline salts, of which soap is composed. Hence, if soap contain any superfluous quantity of either the oil or salt, it may, by means of this menstruum, be excellently purified therefrom. It dissolves, by the assistance of heat, volatile alkaline salts; and more readily the neutral ones, composed either of fixed alkali and the acetous acid, as the sal diureticus, or of volatile alkali and the nitrous acid. Oils dissolve vegetable resins and balsams, wax, animal fats, mineral bitumens, sulphur, and certain metallic substances, particularly lead. The expressed oils are, for the most of these bodies, more powerful menstrua than those obtained by distillation; as the former are more capable of sustaining without injury a strong heat, which is in most cases necessary to enable them to act. All acids dissolve alkaline salts, alkaline earths, and metallic substances. The different acids differ greatly in their action, upon these last: one dissolving some particular metals; and another, others. The vegetable acids dissolve a considerable quantity of zinc, iron, copper, and tin; and extract so much from the metallic part of antimony as to become powerfully emetic: they likewise dissolve lead, if previously calcined by fire; but more copiously if corroded by their steam. The marine acid dissolves zinc, iron, and copper; and though it scarce acts on any other metallic substance in the common way of making solutions, may, nevertheless, be artfully combined with them all except gold. The corrosive sublimate and antimonial caustic of the shops are combinations of it with mercury and the metallic part of antimony, effected by applying the acid in the form of fume, to the subjects at the same time strongly heated. The nitrous acid is the common menstruum of all metallic substances, except gold and the antimonial semi-metal, which are soluble only in a mixture of the nitrous and marine. The vitriolic acid easily dissolves zinc, iron, and copper; and may be made to corrode, or imperfectly dissolve most of the other metals. Alkaline lixivia dissolve oils, resinous substances, and sulphur. Their power is greatly promoted by the addition of quick-lime, instances of which occur in the preparation of soap and in the common caustic. Thus assisted, they reduce the flesh, bones, and other solid parts of animals, into a gelatinous matter. Solutions made in water and spirit of wine possess the virtue of the body dissolved; whilst oils generally sheathe its activity, and acids and alkalies vary its quality. Hence watery and spiritous liquors are the proper menstrua of the native virtues of vegetable and animal matters. Most of the foregoing solutions are easily effected, by pouring the menstruum on the body to be dissolved, and suffering them to stand together for some time, exposed to a suitable warmth. A strong heat is generally requisite to enable oils and alkaline liquors to perform their office; nor will acids act on some metallic bodies without its assistance. The action of watery and spirituous menstrua is likewise expedited by a moderate heat, though the quantity which they afterwards keep dissolved is not, as some suppose, by this means increased. All that heat occasions these to take up more than they would do in a longer time in the cold will, when the heat ceases, subside again. The action of acids on the bodies which they dissolve is generally accompanied with heat, effervescence, and a copious discharge of fumes. The fumes which arise during the dissolution of some metals in the vitriolic acid prove inflammable: hence in the preparation of the artificial vitriols of iron and zinc, the operator ought to be careful, especially where the solution is made in a narrow-mouthed vessel, lest, by the imprudent approach of a candle, the exhaling vapour be set on fire. There is another species of solution in which the moisture of air is the menstruum. Fixed alkaline salts and those of the neutral kind, composed of alkaline salts and the vegetable acids, or of alkaline earths, and any acid except the vitriolic, and some metallic salts on being exposed for some time to a moist air, gradually attract its humidity, and at length become liquid. Some substances, not dissoluble by water in its grosser form, as the butter of antimony, are easily liquified by this slow action of the aereal moisture. This process is termed *deliquation*. The cause of solution assigned by some naturalists, namely, the admission of the fine particles of one body into the pores of another, whose figure fits them for their reception, is not just or adequate, but hypothetical and ill-presumed; since it is found that some bodies will dissolve their own quantity of others, as water does of Epsom salt, alkohol of essential oils, mercury of metals, one metal of another, &c. whereas the sum of the pores or vacuities of every body must be necessarily less than the body itself, and consequently those pores cannot receive a quantity of matter equal to the body wherein they reside.

How a menstruum can suspend bodies much heavier than itself, which very often happens, may be conceived by considering, that the parts of no fluids can be so easily separated, but that they will a little resist or retard the

descent of any heavy bodies through them: and that this resistance is, *cæteris paribus*, still proportionable to the surface of the descending bodies. But the surface of bodies by no means increase or decrease in the same proportion as their solidities do: for the solidity increases as the cube, but the surface only as the square of the diameter; wherefore it is plain, that very small bodies will have much larger surfaces, in proportion to their solid contents, than larger bodies will, and consequently, when become exceeding small, may easily be buoyed up in the liquor.

MENSURABI'LITY. *s.* (*mensurabilité*, French.) Capacity of being measured.

ME'NSURABLE. *a.* (*mensura*, Lat.) Measurable; that may be measured (*Holder*).

ME'NSURAL. *a.* (from *mensura*, Latin.) Relating to measure.

To ME'NSURATE. *v. a.* (from *mensura*, Latin.) To measure; to take the dimension of any thing.

MENSURATION, the act, or art, of measuring figured extension and bodies; or of finding the dimensions, and contents of bodies, both superficial and solid.

Every different species of mensuration is estimated and measured by others of the same kind; so, the solid contents of bodies are measured by cubes, as cubic inches, or cubic feet, &c.; surfaces by squares, as square inches, feet, &c.; and lengths or distances by other lines, as inches, feet, &c.

The contents of rectilinear figures, whether plane or solid, can be accurately determined, or expressed; but of many curved ones, not. So the quadrature of the circle, and cubature of the sphere, are problems that have never yet been accurately solved. See the various kinds of mensuration, as well as that of the different figures, under their respective terms.

The first writers on Geometry were chiefly writers on Mensuration; as Euclid, Archimedes, &c. The best modern authors on Mensuration are Mr. Robertson, and Dr. Hutton. The work of the last mentioned author cannot be too warmly recommended; being very comprehensive, and peculiarly valuable both as it relates to the theory and practice.

MENTA'GRA. (*mentagra*, from *mentum*, the chin, and αγρα, a prey.) An eruption about the chin, forming a tenacious crust, like that on scald heads.

ME'NTAL. *a.* (*mentale*, French; *mentis*, Latin.) Intellectual; existing in the mind (*Milton*).

ME'NTALLY. *ad.* Intellectually; in the mind; not practically or externally, but in thought or meditation (*Bentley*).

MENTASTRUM. (*mentastrum*, of *mentha*, mint.) The red water mint. See MENTHA AQUATICA.

MENTHA. Mint. In botany, a genus of the class didynamia, order gymnospermia. Calyx five-cleft; corol nearly equal, four-cleft; the broadest segment notched; stamens erect, distant. Twenty species; almost all natives of Europe; two or three of India, and one of America; twelve common to the wastes, wet fields, ditches, and river banks of England. The following are the chief:

1. M. viridis. Spear-mint. Spikes interrupted, leaves sessile, lanceolate, acute, naked; bractes setaceous, a little hairy; teeth of the calyx somewhat hairy. It is common to our own marshes, and is an article in the London Pharmacopœia of the Royal College, under the name of mentha sativa. It is less warm than pepper-mint, but of more pleasant flavour, and hence more generally used for culinary purposes. It is a good stomachic, antispasmodic, and carminative; highly useful in anomalous retchings and other dyspeptic symptoms, often producing instantaneous relief Its officinal preparations are an essential oil, a spirit, and a simple water.

2. M. piperita. Pepper-mint. Spikes obtuse, interrupted below; leaves petioled, somewhat ovate, nearly glabrous; calyx quite glabrous at the base. Found wild in our wet fields. The mentha piperitis of the London college, possesses a more pungent taste than spear-mint: is medically appropriated to the same uses; and officinally yields an essential oil, spirit, and simple water.

3. M. pulegium. Penny-royal. Flowers in whorls; leaves ovate; stem prostrate; pedicels and calyxes every where downy; teeth of the latter ciliate. Found on our wet heaths; and employed medicinally like the two preceding under the name of PULEGIUM, which see.

4. M. cervina. Hart's penny-royal. Flowers in whorls; bractes palmate; leaves linear; stamens longer than the corol. A native of Montpellier: employed medicinally under the name of PULEGIUM CERVINUM, which see. These are all easily propagated by cuttings, or dividing the roots.

MENTI'GO. (from *mentum*, the chin.) The scab among sheep, so called because it infests their mouths and chins.

ME'NTION. *s.* (*mention*, French; *mentio*, Latin.) 1. Oral or written recital of any thing (*Rogers*). 2. Cursory or incidental nomination (*Milton*).

To ME'NTION. *v. a.* (*mentionner*, French.) To write or express in words or writing (*Isa.*).

MENTON, a city of Italy, in the principality of Monaco, with a castle. It has a considerable trade in fruit and oil; and is seated near the sea, five miles E.N.E. of Monaco, and eight W.S.W. of Ventimiglia. Lon. 7. 35 E Lat. 43. 46 N.

MENTOR, in fabulous history, a faithful friend of Ulysses.—An excellent artist in polishing cups, and engraving flowers on them.

MENTZ, an archbishopric and electorate of Germany, in the circle of Lower Rhine; bounded on the N. by Weteravia and Hesse, on the E. by Franconia, on S. by the palatinate of the Rhine, and on the W. by the electorate of Treves. It is 50 miles long and 20 broad, and very fertile. The elector is also sovereign

of Eichsfeld, Eisfeld, or Eifeld (a country surrounded by Hesse, Thuringia, Grubenhagen, and Calenberg), and of the city and territory of Erfort, in Thuringia.

MENTZ, or MAYENCE, a considerable city of Germany, capital of the electorate of Mentz, with a university, and an archbishop's see. The archbishop is an elector of the empire, arch-chancellor of the empire, keeper of the archives, and director of the general and particular assemblies. This city is built in an irregular manner, and plentifully provided with churches. In the cathedral, which is a gloomy fabric, is what they call a treasury, which contains a number of clumsy jewels, some relics, and a rich wardrobe of sacerdotal vestments. Mentz is one of the towns which claim the invention of printing; and the growth of the best rhenish wine is limited to a circle of about five miles round it. The French took this place by surprise, in October 1792; and they so greatly strengthened the fortifications, that, the next year, it stood a long blockade and siege against the king of Prussia, to whom, however, it surrendered in July 1793. It was re-attacked by the French in 1795, but they were defeated before it, both in April and October, by the Austrians, who also relieved it from a blockade of two months, in September 1796. They soon after, however, resumed the siege, which continued till the signing of the treaty of Udina, in October 1797, after which the emperor withdrawing the Austrian troops, and leaving the defence of it to the troops of the empire, it surrendered to the French, who still retain possession of it. Mentz is seated on the Rhine, just below its confluence with the Maine; and opposite to it, on the E. side, is the strong town of Cassel, connected with it by a bridge of boats. It is 15 miles W. of Francfort, and 75 E. of Treves. Lon. 8. 10 E. Lat. 49. 56 N.

MENTZEL (Christian), born at Furstenwail in the Mittlemark, celebrated for his skill in medicine and botany, in pursuit of which he travelled through many countries. He had correspondents in the most distant parts of the world. He died A. D. 1701, about the 79th year of his age. He was a member of the academy des Curieux de la Nature. His works are, 1. Index nominum plantarum, printed at Berlin in folio, 1696; and reprinted with additions in 1725, under the title of Lexicon plantarum polyglotton universale. 2. A Chronology of China, in German, printed at Berlin 1696, in 4to. The following manuscripts of his composition are preserved in the royal library at Berlin. 1. Sur l'histoire naturelle du Brasil, in four volumes, folio. 2. Sur les fleurs et les plantes du Japon, with coloured plates, two vols. folio.

MENTZELIA. In botany, a genus of the class polyandria, order monogynia. Calyx five-leaved; petals five; capsule inferior, cylindric, many-seeded. Two species; American plants, with slender stalks covered with short prickles unarmed; leaves ovate, very entire, rather acute, downy underneath; germs glabrous; berries two or three seeded. A native of Siberia, with small, roundish, bright red fruit.

4. M. oxyacantha. White-thorn. Hawthorn. May. Glastonbury-thorn. Spinous; leaves obtuse, mostly trifid, serrate, glabrous; segments of the calyx lanceolate, acute; styles three. There is another variety, with large kidney-form stipules. Found wild in our own hedges.

5. M. pyracantha. Evergreen-thorn. Spinous; leaves lanceolate, crenate; calyx of the fruit obtuse; styles five. The flowers are succeeded by red berries, which make a beautiful appearance through the winter. It is a native of France and Italy.

MENYANTHES. Buck-bean. In botany, a genus of the class pentandria, order monogynia: corol hairy; stigma cloven; capsule one-celled. Five species; one a native of the Cape; two of India; two of Europe, and found on the river banks or in the marshes of our own country. The following are the chief:

1. M. nymphæoides. Leaves cordate, repand; corols ciliate. Found on our river banks and in our rivers.

2. M. trifoliata. Leaves three on the same peticle. Found in our marshes.

3. M. cristata. Leaves cordate, with waved margin; corols crowned at the mouth of the tube only with white filaments; peticles with flower-bearing tubercles, leaves and roots a little below the top; peduncles one-flowered, flowers white; nectaries triple; below the filaments five yellow glandular bodies alternating with the stamens; and five hairy yellow bodies surrounding the base of the germ. A native of the East Indies.

MENZIERIA. In botany, a genus of the class octandria, order monogynia. Calyx one-leafed, repand; corol one-petalled; stamens inserted on the receptacle; capsule superior, four-celled, with the partitions from the inflected margins of the valves. One species; a branchy shrub of North America, with axillary, nodding, ferruginous flowers.

MENZIKOFF (Alexander), a prince of the Russian empire, was the son of a peasant, and the servant of a pastry-cook, who employed him to cry pies about the streets. His manners struck Peter the Great, who took him into his service, in which he behaved so as to gain the particular favour of that monarch. He was raised to the rank of major-general, and to the title of prince. He continued in the same degree of favour with the empress Catharine as he had with Peter the Great. Peter II. married the daughter of Menzikoff; but this served only to ruin him, for, intoxicated with the distinctions he had received, his conduct laid him open to the attacks of his enemies, and he fell into disgrace. He died in Siberia, whither he had been banished, in 1729.

MENZINI (Benedict), an Italian poet, born at Florence in 1646, and died in 1704.

He wrote a book entitled, Construzione irregolare della Lingua Toscana; and another, De Arte Poetica. His satires are esteemed good productions. All his works were printed after his death, in 4 vols. 8vo.

MEOTIS, or PALUS MEOTIS, a sea of Turkey which divides Europe from Asia; extending from Crim Tartary to the mouth of the river Don or Tanais.

MEPHITIC, a name expressing any kind of noxious vapour; but generally applied to that species of vapour called fixed air See AIR, FIXED AIR, GAS, &c.

MEPHITIC GASS. See SEPTON.

MEPHITIS. (μεφιτις, from *mephuith*, Syr. a blast.) A poisonous exhalation. See CONTAGION.

MEPHITUS FANUM, a temple erected to the goddess Mephitis, near Lacus Amsancti; who was worshipped also at Cremona.

MEQUINENZA, a town of Spain, in the kingdom of Arragon, at the conflux of the Segre, the Cinca, and the Ebro. It is ancient, and defended by a castle, and was once the see of a bishop; thirty-eight miles S.S.W. Balbastro, and sixteen S.S W. Lerida.

MEQUINEZ, a city of Africa, in the empire of Morocco, situated in a plain, surrounded with fertile vallies and eminences, watered by a number of rivers. It is surrounded with walls, and the palace is fortified with bastions; this is an extensive building, and includes several gardens. The Jews have a quarter appropriated to themselves, walled in and guarded. The Moors at Mequinez are much more affable than in the southern provinces. There is, both at Mequinez and Morocco, a hospital, or convent, of Spanish recollects, founded more than a hundred years ago, by the munificence of the kings of Spain, for the benefit and spiritual comfort of the Christian captives. These two convents are much respected in the country, both for the exemplary lives of the fathers and the service they are of to the poor, whom they supply with medicines gratis: twenty-six miles S.W. Fez, and 165 N.E. Morocco. Lon. 6. 6 W. Lat. 33. 16 N.

MERA'CIOUS. *a.* (*meracus*, Lat.) Strong; racy.

MERA'ZION, or MARKET JEW, a seaport in Cornwall, with a market on Thursday; seated on an arm of the sea, called Mountsbay, three miles E. of Penzance, and 283 W. by S. of London. Lon. 5. 30 W. Lat. 50. 12 N.

ME'RCABLE. *a.* (*mercor*, Latin.) To be sold or bought.

ME'RCANTANT. *s.* (*mercantante*, Ital.) A foreigner, or foreign trader (*Shakspeare*).

ME'RCANTILE. *a.* Trading; commercial.

ME'RCAT. *s.* (*mercatus*, Latin.) Market; trade (*Sprat*).

MERCATOR (Gerard), one of the most celebrated geographers of his time, was born at Ruremonde in 1512. He applied himself with such industry to geography and mathematics, that he is said to have frequently forgot to eat and drink. The emperor Charles V. had a particular esteem for him, and the duke of Juliers made him his cosmographer. He composed a chronology, some geographical tables, an Atlas, &c. engraving and colouring the maps himself. He died in 1594.

MERCATOR (Nicholas), an eminent mathematician in the 17th century, was born at Holstein in Denmark; and came to England about the time of the restoration, where he lived many years. He was fellow of the Royal Society; and endeavoured to reduce astrology to rational principles, as appeared from a MS. of his in the possession of William Jones, Esq. He published several works, particularly Cosmographia. He gave the quadrature of the hyperbola by an infinite series; which was the first appearance in the learned world of a series of this sort drawn from the particular nature of the curve, and that in a manner very new and abstracted. For more particulars respecting this extraordinary man, see Hutton's Mathematical Dictionary.

MERCATOR'S CHART, OR PROJECTION, is a projection of the surface of the earth in plano, so called from Gerard Mercator, a Flemish geographer, who first published maps of this sort in the year 1556; though it was Edward Wright who first gave the true principles of such charts, with their application to navigation, in 1599.

In this chart or projection, the meridians, parallels, and rhumbs, are all straight lines, the degrees of longitude being every where increased so as to be equal to one another, and having the degrees of latitude also increased in the same proportion; namely, at every latitude or point on the globe, the degrees of latitude, and of longitude, or the parallels, are increased in the proportion of radius to the sine of the polar distance, or cosine of the latitude; or, which is the same thing, in the proportion of the secant of the latitude to radius; a proportion which has the effect of making all the parallel circles be represented by parallel and equal right lines, and all the meridians by parallel lines also, but increasing infinitely towards the poles.

From this proportion of the increase of the degrees of the meridian, viz. that they increase as the secant of the latitude, it is very evident that the length of an arch of the meridian, beginning at the equator, is proportional to the sum of all the secants of the latitude, *i. e.* that the increased meridian, is to the true arch of it, as the sum of all those secants, to as many times the radius. But it is not so evident that the same increased meridian is also analogous to a scale of the logarithmic tangents, which however it is. It does not appear who it was that discovered the analogy between a scale of logarithmic tangents and Wright's protraction of the nautical meridian line, which consisted of the sums of the secants. It appears however to have been first published, and introduced into the practice of navigation, by Mr. Henry Bond, who mentions this property in an edition of Norwood's Epitome of Navigation, printed about 1645; and

he again treats of it more fully in an edition of Gunter's works, printed in 1653, where he teaches, from this property, to resolve all the cases of Mercator's Sailing by the logarithmic tangents, independent of the table of meridional parts. This analogy had only been found however to be nearly true by trials, but not demonstrated to be a mathematical property. Such demonstration, it seems, was first discovered by Mr. Nicholas Mercator, which he offered a wager to disclose, but this not being accepted, Mercator reserved his demonstration. The proposal however excited the attention of mathematicians to the subject, and demonstrations were not long wanting. The first was published about two years after, by James Gregory, in his Exercitationes Geometricæ, from hence, and other similar properties there demonstrated, he shews how the tables of logarithmic tangents and secants may easily be computed from the natural tangents and secants.

The same analogy between the logarithmic tangents and the meridian line, as also other similar properties, were afterwards more elegantly demonstrated by Dr Halley, in the Philos Trans for Feb. 1696, and various methods given for computing the same, by examining the nature of the spirals into which the rhumbs are transformed in the stereographic projection of the sphere on the plane of the equator the doctrine of which was rendered still more easy and elegant by Mr. Cotes in his Logometria

MERCATOR'S SAILING, or more properly Wright's Sailing, is the method of computing the cases of sailing on the principles of Mercator's chart, which principles were laid down by Edward Wright in the beginning of the last century, or the art of finding on a plane the motion of a ship upon any assigned course, that shall be true as well in longitude and latitude, as distance, the meridians being all parallel, and the parallels of latitude straight lines. See NAVIGATION.

MERCATORUM FESTUM, was a festival kept by the Roman merchants on the 15th of May in honour of Mercury, who presided over merchandise. A sow was sacrificed on the occasion, and the people present sprinkled themselves with water fetched from the fountain called *aqua Mercurii*, the whole concluding with prayers to the god for the prosperity of trade.

ME'RCATURE. *s.* (*mercatura*, Lat.) The practice of buying and selling.

ME'RCENARINESS. *s.* (from *mercenary*.) Venality, respect to hire or reward (*Boyle*)

ME'RCENARY. *a.* (*mercenaire*, French.) 1. Venal; hired; sold for money (*Hayward*). 2. Too studious of profit (*South*).

ME'RCENARY. *s* A hireling; one retained or serving for pay (*Sandys*).

ME'RCER *s* (*mercier*, French.) One who sells silks (*Howel*).

ME'RCERY. *s.* (*mercerie*, French.) Trade of mercers, traffic of silks (*Graunt*).

To ME'RCHAND. *v n.* (*marchander*, Fr.) To transact by traffic (*Bacon*).

ME'RCHANDISE. *s.* (*marchandise*, Fr.) 1. Traffic; commerce; trade (*Taylor*). 2. Wares; any thing to be bought or sold.

To ME'RCHANDISE. *v. n.* To trade, to traffic; to exercise commerce (*Brerewood*).

ME'RCHANT. *s.* (*marchand*, French.) One who traffics to remote countries (*Addis.*).

ME'RCHANTABLE *a.* (from *merchant*.) Fit to be bought or sold (*Brown*).

ME'RCHANTLIKE ME'RCHANTLY. *a.* Like a merchant (*Ainsworth*).

ME'RCHANT-MAN *s.* A ship of trade.

MERCHET (*merchetum*), a fine or composition paid by inferior tenants to the lord, for liberty to dispose of their daughters in marriage. No baron, or military tenant, could marry his sole daughter and heir, without such leave purchased from the king, *pro maritanda filia*. And many of our servile tenants could neither send their sons to school, nor give their daughters in marriage, without express leave from the superior lord. See Kennet's Glossary, in Maritagium. See also MARCHET

MERCIA, the name of one of the seven kingdoms founded in England by the Saxons. Though the latest formed, it was the largest of them all, and grew by degrees to be by far the most powerful. On the north it was bounded by the Humber and the Mersey, which separated it from the kingdom of Northumberland; on the east by the sea, and the territories of the East-Angles and Saxons, on the south by the river Thames, and on the west by the rivers Severn and Dee. It comprehended well nigh seventeen of our modern counties, being equal in size to the province of Languedoc in France, very little, if at all, less than the kingdom of Arragon in Spain, and superior in size to that of Bohemia in Germany.

Penda is regarded as its first monarch; and the kingdom is thought to derive its name from the Saxon word *merc*, which signifies a march, bound, or limit, because the other kingdoms bordered upon it on every side, and not from the river Mersey, as some would persuade us. Penda assumed the regal title A. D 626, and was of the age of 50 at the time of his accession, after which he reigned near 30 years.

MERCIER (John), a French philosopher, was a native of Languedoc, and died in 1562. He succeeded Varablus as professor of Hebrew in the royal college of Paris His works chiefly consist of Commentaries on the Old Testament, and a Chaldee grammar.

ME'RCIFUL. *a.* (*mercy* and *full*.) Compassionate; tender; kind; unwilling to punish; willing to pity and spare (*Deut.*).

ME'RCIFULLY. *ad.* Tenderly; mildly; with pity; with compassion (*Atterbury*).

ME'RCIFULNESS. *s.* (from *merciful*.) Tenderness; willingness to spare (*Hammond*).

ME'RCILESS. *a.* (from *mercy*.) Void of mercy; pitiless; hardhearted; cruel (*Denham*).

ME'RCILESSLY. *ad.* (from *merciless*. In a manner void of pity.

MERCILESSNESS. *s.* (from *merciless.*) Want of pity.

MERCURIAL. *a.* (*mercurialis*, Latin.) 1. Formed under the influence of Mercury; active; sprightly (*Bacon*). 2. Consisting of quicksilver.

MERCURIALIS (Jerom), an eminent Italian physician, born at Forli in 1530, where he first practised; but afterwards was professor of medicine successively at Padua, Bologna, and Pisa. His writings in physic are very numerous; besides giving an edition of Hippocrates in Greek and Latin, with notes, which, however, did not answer the expectations of the learned. He died in 1606; and in 1644 some pieces of his were published at Venice in one volume folio.

Mercurialis. Mercury. In botany, a genus of the class diœcia, order cancandria. Calyx three-parted; corolless. Male: stamens from nine to twelve; anthers globular, twin. Fem.: styles two; berry two-grained, two-celled; seeds one in each cell. Six species; four European; one Cochin Chinese; one a Cape plant: two common to our own wastes and hedges: these last are as follow:

1. M. perennis. Stem quite simple; leaves rough; root creeping. Found wild in our hedges: when very young an innoxious esculent; but towards the middle of summer and autumn, highly poisonous; and has often produced great mischief by having been mistaken for chenopodium. M. perennis is described by many botanists under the name of cynocrambe.

2. M. annua. Stem cross-armed; leaves glabrous; flowers racemed; roots fibrous. It is used as a purgative under various forms by the French, chiefly as a syrup, and in enemas.

MERCURIUS, a celebrated god of antiquity, called Hermes by the Greeks. There were no less than five of this name, according to Cicero. Some add a sixth, but to the son of Jupiter and Maia, the actions of all the others have been probably attributed. Mercury was the messenger of the gods, and of Jupiter in particular; the patron of travellers and of shepherds; he conducted the souls of the dead into the infernal regions, and not only presided over orators, merchants, declaimers, but he was also the god of thieves, pickpockets, and all dishonest persons. His name is derived *a mercibus*, because he was the god of merchandise among the Latins. He was born in Arcadia, on mount Cyllene. The day that he was born, he gave proof of his craftiness in stealing away the oxen of Admetus, which Apollo tended. He gave other proofs of his thievish propensity, by taking also the quiver and arrows of Apollo; and he increased his fame by robbing Neptune of his trident, Venus of her girdle, Mars of his sword, Jupiter of his sceptre, and Vulcan of many of his mechanical instruments. Jupiter then took him as his messenger, interpreter, and cup-bearer. He was presented by the king of heaven with a winged cap, called petasus, and with wings for his feet, called talaria. As messenger of Jupiter, he was entrusted with all his secrets, and was the ambassador and plenipotentiary of the gods. The invention of the lyre and its seven strings is ascribed to him. This he gave to Apollo, and received in exchange the celebrated caduceus with which the god of poetry used to drive the flocks of king Admetus. (See Caduceus.) He delivered Mars from the long confinement which he suffered from the superior power of the Aloides. He purified the Danaides of the murder of their husbands; he tied Ixion to his wheel in the infernal regions; he destroyed the hundred-eyed Argus; he sold Hercules to Omphale, the queen of Lydia; he conducted Priam to the tent of Achilles to redeem the body of his son Hector. Mercury had many surnames and epithets; his amours were also numerous. His worship was well established, particularly in Greece, Egypt, and Italy. The Roman merchants yearly celebrated a festival on the 15th of May, in honour of Mercury, in a temple near the Circus Maximus. Here they intreated him to forgive whatever artful measures, false oaths, or falsehoods they had used or uttered in the pursuit of gain. The chief ensigns of his power and offices are his caduceus, his petasus, and his talaria. Some of his statues represented him as a youth. The Greeks and Romans offered tongues to him, by throwing them into the fire, as he was the patron of speaking, of which the tongue is the organ.

Mercurius Trismegistes, a priest and philosopher of Egypt, who taught his countrymen how to cultivate the olive, measure their lands, and to understand hieroglyphics. He lived in the age of Osiris, and wrote 40 books on theology, medicine, and geography, from which Sanchoniathon the Phœnician historian has taken his theogonia.

Mercurius. (*mercurius*, the chemical name of quicksilver, from its activity.) In pharmacy. See Hydrargyrus.

Mercurius acetatus. See Hydrargyrus acetatus.

Mercurius calcinatus. See Hydrargyrus calcinatus.

Mercurius corrosivus. See Hydrargyrus muriatus.

Mercurius corrosivus ruber. See Hydrargyrus nitratus ruber.

Mercurius corrosivus sublimatus. See Hydrargyrus muriatus.

Mercurius emeticus flavius. See Hydrargyrus vitriolatus.

Mercurius præcipitatus albus. Se Calx hydrargyri alba.

Mercurius præcipitatus dulcis See Hydrargyrus muriatus mitis.

Mercurius præcipitatus ruber. S Hydrargyrus nitratus ruber.

MERCURY, the smallest of the inferi planets, and the nearest to the sun, abo which it is carried with a very rapid motio Hence it was, that the Greeks called this plan after the name of the nimble messenger of t gods, and represented it by the figure of

youth with wings at his head and feet; from whence is derived ☿, the character in present use for this planet.

The mean distance of Mercury from the sun, is to that of the earth from the sun, as 387 to 1000, and therefore his distance is about 36 millions of miles, or little more than one-third of the earth's distance from the sun. See ASTRONOMY.

MERCURY. (*mercurius*, Lat.; so denominated by the chemists from its volatility.) Hydrargyrum. Argentum vivum. Quicksilver. Under the article HYDRARGYRUM we have considered this metal mineralogically, and pharmaceutically; have explained its characters; enumerated its ores; and treated of its medicinal preparations. We shall consider it in a chemical and metallurgic point of view. The colour of mercury is white, and similar to that of silver; hence the names hydrargyrus, argentum vivum, quicksilver, by which it has been known in all ages. It has no taste nor smell. It possesses a good deal of brilliancy; and when its surface is not tarnished, makes a very good mirror. Its specific gravity is 13.568. At the common temperature of the atmosphere, it is always in a state of fluidity. In this respect it differs from all other metals. But it becomes solid when exposed to a sufficient degree of cold. The temperature necessary for freezing this metal is —39°, as was ascertained by the experiments of Mr. Macnab, at Hudson's-bay. The congelation of mercury was accidentally discovered by the St. Petersburgh academicians in 1759. Taking the advantage of a very severe frost, they plunged a thermometer into a mixture of snow and salt, in order to ascertain the degree of cold. Observing the mercury stationary, even after it was removed from the mixture, they broke the bulb of the thermometer, and found the metal frozen into a solid mass. This experiment has been repeated very often since, especially in Britain. Mercury contracts considerably at the instant of freezing; a circumstance which misled the philosophers who first witnessed its congelation. The mercury in their thermometers sunk so much before it froze, that they thought the cold to which it had been exposed much greater than it really was. It was in consequence of the rules laid down by Mr. Cavendish, that Mr. Macnab was enabled to ascertain the real freezing point of the metal.

Solid mercury may be subjected to the blows of a hammer, and may be extended without breaking. It is therefore malleable; but neither the degree of its malleability, nor its ductility, nor its tenacity, has been ascertained.

Mercury boils when heated to 660°. It may therefore be totally evaporated, or distilled from one vessel into another. It is by distillation that mercury is purified from various metallic bodies, with which it is often contaminated. The vapour of mercury is invisible and elastic like common air; like air, too, its elasticity is indefinitely increased by heat, so that it breaks through the strongest vessel. Geoffroy, at the desire of an alchymist, inclosed a quantity of it in an iron globe, strongly secured by iron hoops, and put the apparatus into a furnace. Soon after the globe became red-hot, it burst with all the violence of a bomb, and the whole of the mercury was dissipated.

Mercury is not altered by being kept under water. When exposed to the air, its surface is gradually tarnished, and covered with a black powder, owing to its combining with the oxygen of the atmosphere. But this change goes on very slowly, unless the mercury is either heated or agitated, by shaking it, for instance, in a large bottle full of air. By either of these processes, the metal is converted into an oxyd: by the last, into a black-coloured oxyd; and by the first, into a red-coloured oxyd. This metal does not seem to be capable of combustion.

The oxyds of mercury at present known are four in number.

1. The protoxyd was first described with accuracy by Boerhaave. He formed it by putting a little mercury into a bottle, and tying it to the spoke of a mill-wheel. By the constant agitation which it thus underwent, it was converted into a black powder, to which he gave the name of *ethiops per se*. This oxyd is readily formed by agitating pure mercury in a phial. It is a black powder without any of the metallic lustre, has no taste, and is insoluble in water. According to the experiments of Fourcroy, it is composed of 96 parts of mercury and four of oxygen. When this oxyd is exposed to a strong heat, oxygen gass is emitted, and the mercury reduced to the metallic state. In a more moderate heat it combines with an additional dose of oxygen, and assumes a red colour.

2. When mercury is dissolved in nitric acid without the assistance of heat, and the acid is made to take up as much mercury as possible, it has been demonstrated, by the experiments of Mr. Chenevix, that it combines in that case with 10.7 per cent. of oxygen. Of course an oxyd is formed, composed of 89.3 mercury and 10.7 oxygen. This is the deutoxyd of mercury. This oxyd cannot be separated completely from the acid which holds it in solution without undergoing a change in its composition; of course we are at present ignorant of its colour and other properties. Indeed it is very probable that it is the same with the black oxyd just described under the name of protoxyd; but this has not yet been proved in a satisfactory manner.

3. When mercury, or its protoxyd, is exposed to a heat of about 600°, it combines with additional oxygen, assumes a red colour, and is converted into an oxyd, which, in the present state of our knowledge, we must consider as a tritoxyd. This oxyd may be formed two different ways: 1. By putting a little mercury into a flat-bottomed glass bottle or matrass, the neck of which is drawn out into a very narrow tube, putting the matrass into a sand-bath, and keeping it constantly at the boiling point. The height of the matrass, and the smallness of its mouth, prevent the mercury from making its

escape, while it affords free access to the air. The surface of the mercury becomes gradually black, and then red, by combining with the oxygen of the air: and at the end of several months the whole is converted into a red powder, or rather into small crystals, of a very deep red colour. The oxyd, when thus obtained, was formerly called precipitate per se. 2. When mercury is dissolved, in nitric acid, evaporated to dryness, and then exposed to a pretty strong heat in a porcelain cup, it assumes, when triturated, a brilliant red colour. The powder thus obtained was formerly called red precipitate, and possesses exactly the properties of the oxyd obtained by the former process.

This oxyd has an acrid and disagreeable taste, possessing poisonous qualities, and acts as an escharotic when applied to any part of the skin. It is somewhat soluble in water. When triturated with mercury it gives out part of its oxygen, and the whole mixture is converted into protoxyd or black oxyd of mercury. When heated along with zinc, or tin filings, it sets these metals on fire. According to Fourcroy, it is composed of 92 parts of mercury and 8 of oxygen. But the analysis of Mr. Chenevix, to be described hereafter, gives for the proportion of its component parts, 85 parts of mercury and 15 parts of oxygen.

The red oxyd of mercury, prepared in the usual way, is not pure, but always contains a portion of nitric acid. If we dissolve it in muriatic acid, and precipitate it again, it falls in the state of a white powder, and retains a portion of muriatic acid. It was in this state that it was examined by Chenevix. The difficulty of procuring this oxyd in a state of purity, and the uncertainty respecting the proportion of acid which it retains, may, in some measure, account for the different results obtained by different chemists in their attempts to ascertain its proportions.

4. Fourcroy has observed, that when oxymuriatic acid gass is made to pass through the red oxyd of mercury, it combines with an additional dose of oxygen, and is converted into a peroxyd; but as this peroxyd cannot be procured in a separate state, we are ignorant of its properties.

Mercury does not combine with carbon or hydrogen; but it unites readily with sulphur and with phosphorus.

When two parts of sulphur and one of mercury are triturated together in a mortar, the mercury gradually disappears, and the whole assumes the form of a black powder, formerly called ethiops mineral. It is scarcely possible by any process to combine the sulphur and mercury so completely, that small globules of the metal may not be detected by a microscope. When mercury is added slowly to its own weight of melted sulphur, and the mixture is constantly stirred, the same black compound is formed.

Fourcroy has suggested, that in this compound the mercury is in the state of black oxyd, absorbing the necessary portion of oxygen from the atmosphere during its combination with the sulphur. But the late experiments of Proust have shewn that this is not the case. Berthollet has made it probable that ethiops mineral contains sulphureted hydrogen. Hence we must consider it as composed of three ingredients, namely, mercury, sulphur, and sulphereted hydrogen. Such compounds are at present denominated by chemists hydrogenous sulphurets. Ethiops mineral of course is an hydrogenous sulphuret of mercury. When this substance is heated, part of the sulphur is dissipated, and the compound assumes a deep violet colour.

When heated red-hot, it sublimes; and if a proper vessel is placed to receive it, a cake is obtained of a fine red colour. This cake was formerly called cinnabar; and when reduced to a fine powder, is well known in commerce under the name of vermilion. It has been hitherto supposed a compound of the oxyd of mercury and sulphur. But the experiments of Proust have demonstrated that the mercury which it contains is in the metallic state. According to that very accurate chemist, it is composed of 85 parts of mercury and 15 of sulphur. It is therefore sulphuret of mercury.

The sulphuret of mercury has a scarlet colour, more or less beautiful, according to the mode of preparing it. Its specific gravity is about 10. It is tasteless, insoluble in water, and in muriatic acid, and not altered by exposure to the air. When heated sufficiently, it takes fire, and burns with a blue flame. When mixed with half its weight of iron filings, and distilled in a stone-ware retort, the sulphur combines with the iron, and the mercury passes into the receiver, which ought to contain water. By this process mercury may be obtained in a state of purity. The use of sulphuret of mercury as a paint is well known.

Mr. Pelletier, after several unsuccessful attempts to combine phosphorus and mercury, at last succeeded by distilling a mixture of red oxyd of mercury and phosphorus. Part of the phosphorus combined with the oxygen of the oxyd, and was converted into an acid; the rest combined with the mercury. He observed that the mercury was converted into a black powder before it combined with the phosphorus. As Pelletier could not succeed in his attempts to combine phosphorus with mercury in its metallic state, we must conclude that it is not with mercury, but with the black oxyd of mercury, that the phosphorus combines. The compound, therefore, is not phosphorus of mercury, but black phosphurated oxyd of mercury.

It is of a black colour, of a pretty solid consistence, and capable of being cut with a knife. When exposed to the air, it exhales vapours of phosphorus.

Mercury does not combine with the simple incombustibles.

Mercury combines with the greater number of metals. These combinations are known in chemistry by the name of amalgams.

The amalgam of gold is formed very readily,

MERECZ, a town of Lithuania, seated at the confluence of the Berezino and Merecz, 30 miles N. of Grodno. Lon. 24. 10 E. Lat. 50. 0 N.

ME'RELY. *ad.* (from *mere.*) Simply; only; thus and no other way (*Swift*)

MERETRI'CIOUS. *a.* (*meretricius*, Lat.) Whorish; such as is practised by prostitutes; alluring by false shew (*Roscommon*).

MERETRI'CIOUSLY. *ad.* Whorishly; after the manner of whores.

MERETRI'CIOUSNESS. *s.* (from *meretricious.*) False allurement like that of strumpets.

MERGANSER. See MERGUS.

MERGENTHEIM, a town of Franconia, subject to the grand master of the Teutonic order; and seated on the Tauber, 16 miles S.W. of Wurtzburg. Lon. 8. 50 E. Lat. 49. 30 N.

MERGUI, the capital of a province of the kingdom of Siam, situate on an island, near the coast, with an harbour which is said to be one of the best in the East Indies. Lon. 98. 28 E. Lat. 12. 6 N.

MERGUS, in zoology, a genus of the class aves, order anseres. Bill toothed, slender, cylindrical, hooked at the point; nostrils small, oval, in the middle of the bill; feet four-toed, the outer toe longest. Ten species; five common to our own country, the rest natives of Europe or America.

1. M. cucullatus. Crested merganser. Crest globular, white on each side; body above brown, beneath white.

2. M. merganser. Goosander. Subcrested; white; head, neck, upper part of the breast and wings glossy black; tail cinereous. Feeds on fish; flesh rancid. Sometimes builds on trees, but generally among rocks.

3. M. castor. Dun-diver. Crested, cinereous; head and upper part of the neck bay: chin, middle-quill feathers and belly white.

4. M. serrator. Red-breasted merganser. Crest pendent; breast variegated with reddish; collar white; tail-feathers brown, varied with cinereous. Two other varieties from variety of colouring marks.

5. M. imperialis. Imperial goosander. Varied with black, brown and grey; head smooth; first quill-feathers black; without wing-spot; bills and legs reddish-white. Inhabits Sardinia: size of a goose.

6. M. albellus. Smew. White nun. Crest pendent; hind-head black; body white; back and temples black; wings variegated.

7. M. minutus. Minute marganser. Brown-ash, beneath and chin white; head and upper part of the neck ferruginous: wing-spot white before and behind. Fourteen inches and a half long.

8. M. furcifer. Fork-tailed merganser. Black; head smooth; hind-head, neck, vent, belly and lateral tail-feathers white; front and cheeks pale brown; tail forked.

9. M. fuscus. Brown merganser. Crested; brown, beneath white; chin and breast spotted with black; wings black with a white band.

10. M. cæruleus. Blue merganser. Crested; blue; crown and tail black; chin, belly and spot on the wings white.

These birds, with few exceptions, are of a middle size between that of a goose and of a duck. The edges of both mandibles are serrated: the tongue is thick, set with small bristles, pointing backward; an happy contrivance for holding the slippery fishes, which form their prey, and conducting them into the bird's throat. They swallow, with an undistinguishing voracity, fishes, that are by far too large to enter entire into the stomach; and hence, while the one end is digesting in the œsophagus, the other often remains in the throat.

The head and back of the merganser are black, beautified with a gloss of green. The lower parts of the body are white, the breast tending to a pale yellow. The tail is grey: the eyes, feet, and part of the bill, are red. As this bird is obliged to search for its food by diving, it is capable of remaining a long time under water; and, for this purpose, is furnished with a quantity of air, lodged in a cavity of its body, to serve the purpose of respiration, while it remains below.

The mergansers, from their voracity, and their expertness in swimming, are, perhaps, the most destructive of all birds that plunder the waters: while their flesh, which is dry, and of a bad flavour, makes but a small compensation for the devastations which they commit.

Some of them build in trees: but the greater part in rocks, jutting over precipitous forelands. One or two species are said to have been found as high up the North seas as Iceland, but this is uncommon. In all the species the female is of a smaller size than the male, and differs considerably in the distribution of her colours. Her head is red; and the mantle, or back and neck-feathers, grey. The white nun is the most beautiful of the whole tribe: the white plumage of the fore-parts and the black mantle that covers its back are each perfect in their kind. the tuft of small detached feathers, white upon the crown, but of a dark green shaded with purple upon the hind-part, produces a very elegant effect; while to complete this modest and religious dress of the white nun, the lower part of the neck is half surrounded with a collar of long silky feathers like velvet.

MERIAN (Maria Sibylla), an eminent female painter, was the daughter of an engraver, and born at Frankfort in 1647. Her genius led her to paint reptiles, flowers, and insects, which she designed after nature with a most scrupulous exactness. She even undertook a voyage to Surinam, to paint the insects and reptiles which are peculiar to that climate, and, at her return home, published 2 volumes of engravings after her designs. She died in 1717. Her daughter, Dorothea Henrietta Graff, painted in the same style, and accompanied her mother to Surinam.

MERIANA, in botany, a genus of the class decandria, order monogynia. Calyx five-cleft,

campanulate; petals five, inserted into the calyx; stamens declined; capsules five-celled, many seeded. Two species; Jamaica plants; the rhexia of Swartz.

MERIDA, a strong town of Spain, in Estramadura, built by the Romans, before the birth of Christ. Here are fine remains of antiquity, particularly a triumphal arch. It is seated in an extensive and fertile plain, 45 miles S. by E. of Alcantara. Lon. 6. 4 W. Lat. 38. 42 N.

MERIDA, a town of New Spain, capital of the province of Jucatan, with a bishop's see. It is inhabited by Spaniards and native Americans; and is 30 miles S. of the gulf of Mexico, and 120 N.E. of Campeachy. Lon. 89. 58 W. Lat. 20. 45 N.

MERIDA, a town of New Granada, seated in a country abounding with all kinds of fruits, 130 miles N.E. of Pampeluna. Lon. 71. 0 W. Lat. 8. 30 N.

MERIDIAN. *s.* (*meridien*, French.) 1. Noon; midday (*Dryden*). 2. The line drawn from north to south, which the sun crosses at noon (*Watts*). 3. The particular place or state of any thing. 4. The highest point of glory or power (*Shakspeare*).

MERI'DIAN. *a.* 1. Being at the point of noon (*Milton*). 2. Extended from north to south (*Boyle*). 3. Raised to the highest point.

MERIDIAN, in astronomy, is a great circle of the celestial sphere, passing through the poles of the world, and both the zenith and nadir, crossing the equinoctial at right angles, and dividing the sphere into two equal parts, or hemispheres, the one eastern and the other western. Or, the meridian is a vertical circle passing through the poles of the world.

It is called meridian, from the Latin *meridies*, midday or noon, because when the sun comes to the south part of this circle, it is noon to all those places situated under it.

MERIDIAN, in geography, is a great circle passing through the poles of the earth, and any given place whose meridian it is; and it lies exactly under, or in the plane of, the celestial meridian.

These meridians are various, and change according to the longitude of places; so that their number may be said to be infinite, for that all places from east to west have their several meridians. Farther, as the meridian invests the whole earth, there are many places situated under the same meridian. Also, as it is noon whenever the centre of the sun is in the celestial meridian; and as the meridian of the earth is in the plane of the former; it follows, that it is noon at the same time, in all places situated under the same meridian.

MERIDIAN (First), is that from which the rest are counted, reckoning both east and west; and is the beginning of longitude.

The fixing of the first meridian is a matter merely arbitrary; and hence different persons, nations, and ages, have fixed it differently: from which circumstance some confusion has arisen in geography. The rule among the ancients was, to make it pass through the place farthest to the west that was known. But the moderns knowing that there is no such place on the earth as can be esteemed the most westerly, the way of computing the longitudes of places from one fixed point is much laid aside.

Ptolemy assumed the meridian that passes through the farthest of the Canary Islands, as his first meridian; that being the most western place of the world then known. After him, as more countries were discovered in that quarter, the first meridian was removed farther off. The Arabian geographers chose to fix the first meridian upon the utmost shore of the western ocean. Some fixed it to the island of St. Nicholas near the Cape Verd; Hondius to the isle of St. James; others to the island of Del Corvo, one of the Azores; because on that island the magnetic needle at that time pointed directly north, without any variation: and it was not then known that the declination of the needle is itself subject to variation. The latest geographers, particularly the Dutch, have pitched on the Pike of Teneriffe; others on the Isle of Palm, another of the Canaries; and lastly, the French, by order of the king, on the island of Fero, another of the Canaries.

But, without much regard to any of these rules, geographers and map-makers often assume the meridian of the place where they live, on the capital of their country, or its chief observatory, for a first meridian; and from thence reckon the longitudes of places, east and west.

MERIDIAN ON A GLOBE. See GLOBE.

MERIDIAN LINE, an arch, or part of the meridian of the place, terminated each way by the horizon. Or, a meridian line is the intersection of the plane of the meridian of the place with the plane of the horizon, often called a north-and-south line, because its direction is from north to south.

To draw a meridian line.—There are many ways of doing this; but some of the easiest and simplest are as follow:

1. On an horizontal plane describe several concentric circles AB, *ab*, &c. (fig. 3 Pl. 103.) and on the common centre C erect a stile, or gnomon, perpendicular to the horizontal plane, of about a foot in length. About the 21st of June, between the hours of 9 and 11 in the morning, and between 1 and 3 in the afternoon, observe the points A, *a*, B, *b*, &c. in the circles, where the shadow of the stile terminates. Bisect the arches AB, *ab*, &c. in D, *d*, &c. If then the same right line DE bisect all these arches, it will be the meridian line sought.

As it is not easy to determine precisely the extremity of the shadow, it will be best to make the stile flat at top, and to drill a small hole through it, noting the lucid point projected by it on the arches AB and *ab*, instead of marking the extremity of the shadow itself.

2. Another method is thus: Knowing the south quarter pretty nearly, observe the altitude FE of some star on the east side of it, and not far from the meridian HZRN: (fig. 4. Pl. 103.) then, keeping the quadrant firm on its

axis, so as the plummet may still cut the same degree, direct it to the western side of the meridian, and wait till you find the star has the same altitude as before, as *fe*. Lastly, bisect the angle EC*e*, formed by the intersection of the two planes in which the quadrant has been placed at the time of the two observations, by the right line HR, which will be the meridian sought.

Many other methods are given by authors, of describing a meridian line; as by the pole star, or by equal altitudes of the sun, &c.; by Schooten in his Exercitationes Geometriæ; Grey, Derham, &c. in the Philos. Trans.; by Ferguson in his Lectures on Select Subjects. See also Leybourn in his Dialling, p. 31; and Hutton's Ozanam's Recreations, vol. iii. p. 260.

Meridian line, on a dial, is a right line arising from the intersection of the meridian of the place, with the plane of the dial: this is the line of twelve o'clock, and from hence the division of the hour-lines begin. See Dial.

Meridian (Magnetical), is a great circle passing through the magnetical poles, to which the magnetic needle, or needle of the mariner's compass, conforms itself.

Meridian altitude of the sun and stars, is their altitude when in the meridian of the place where they are observed. Or it may be defined, an arch of a great circle perpendicular to the horizon, and comprehended between the horizon and the sun or star then in the meridian of the place.

MERIDIANI, in antiquity, a name which the Romans gave to a kind of gladiators who entered the arena about noon after the bestiarii (who fought in the morning against beasts) had finished. They were thus called from *meridies*, i. e. noon, the time when they exhibited their shows. The meridiani were a sort of artless combatants, who fought man with man, sword in hand.

MERI'DIONAL. *a.* (*meridional*, French.) 1. Southern (*Brown*). 2. Southerly; having a southern aspect (*Wotton*).

Meridional distance, in navigation, is the same with the departure, or easting and westing, or distance between two meridians.

Meridional parts, miles, or minutes, in navigation, are the parts of the increased or enlarged meridian, in the Mercator's chart. Tables of these parts are in most books of navigation; and they serve both for constructing that sort of charts, and for working that kind of navigation.

The parts of the enlarged meridian increase in proportion as the cosine of the latitude to radius, or which is the same thing, as radius to the secant of the latitude; and therefore it follows, that the whole length of the enlarged nautical meridian, from the equator to any point, or latitude, will be proportional to the sum of all the secants of the several latitudes up to that point of the meridian. And on this principle was the first table of the meridional parts constructed, by the inventor of it, Mr. Edward Wright, and published in 1599, viz. he took the meridional parts

of 1′ = the sec. of 1′;
of 2′ = sec. of 1′ + sec. of 2′;
of 3′ = secants of 1, 2, and 3 min.
of 4′ = secants of 1, 2, 3, and 4 min.

and so on by constant addition of the secants.

The tables of the meridional parts, so constructed, are perhaps exact enough for ordinary practice in navigation; but they would be more accurate if the meridian were divided into more or smaller parts than single minutes; and the smaller the parts, so much the greater the accuracy. But, as a continual subdivision would greatly augment the labour of calculation, other ways of computing such a table have been devised, and treated of, by Bond, Gregory, Oughtred, sir Jonas Moor, Dr. Wallis, Dr. Halley, and others. See Robertson's Navigation, vol. 2, book 8. The best of these methods was derived from this property, viz. that the meridian line in a Mercator's chart is analogous to a scale of logarithmic tangents of half the compliments of the latitudes; from which property also a method of computing the cases of Mercator's Sailing has been deduced, by Dr. Halley. Vide ut supra, also the Philos. Trans. vol. 46, p. 559.

To find the meridional parts to any spheroid, with the same exactness as in a sphere.—Let the semidiameter of the equator be to the distance of the centre from the focus of the generating ellipse, as m to 1. Let A represent the latitude for which the meridional parts are required, s the sine of the latitude, to the radius 1: find the arc B, whose sine is $\frac{s}{m}$; take the logarithmic tangent of half the complement of B, from the common tables; subtract the log. tangent from 10·0000000, or the log. tangent of 45°; multiply the remainder by the number 7915·7044679, and divide the product by m; then the quotient subtracted from the meridional parts in the sphere, computed in the usual manner for the latitude A, will give the meridional parts, expressed in minutes, for the same latitude in the spheroid, when it is the oblate one.

Example. If $mm : 1 :: 1000 : 22$, then the greatest difference of the meridional parts in the sphere and spheroid is 76·0929 minutes. In other cases it is found by multiplying the remainder above mentioned by the number 1174·078.

When the spheroid is oblong, the difference in the meridional parts between the sphere and spheroid, for the same latitude, is then determined by a circular arc. See Philos. Trans. No. 461, sect. 14. Also Maclaurin's Fluxions, art. 895. 899. And Murdoch's Mercator's Sailing, &c.

MERIDIONA'LITY. *s.* (from *meridional.*) Position in the south; aspect towards the south.

MERI'DIONALLY. *ad.* (from *meridional.*) In the direction of the meridian (*Brown*).

MERINDOL, a village of France, in the

department of the Months of the Rhone, whose inhabitants were massacred on account of their religion, in 1545, by virtue of an arret of the parliament of Aix. It is nine miles E. of Cavaillon.

MERINO, the name of a valuable breed of sheep, originally reared in Spain, but now raised in other countries.

The Board of Agriculture offered a premium about three years ago for the best essay on the nature, produce, origin, and extension of this breed of sheep, which was adjudged to Dr. Parry. The following abridgement of the doctor's essay, which, we doubt not, will be entertaining to our commercial readers, is extracted from the Retrospect of Arts and Manufactures.

That the importance of the question, submitted by the Board, may be more fully estimated, the doctor has devoted one chapter to the quantity and value of superfine wool imported into England from foreign countries. That the quantity may be ascertained from undoubted authority, he has availed himself of an account presented to parliament, of wool purchased in foreign countries in 1802, 1803, and 1804. In these three years were imported from Spain 16,986,644lbs. from Holland 403,400lbs. from Portugal 400,723lbs. from Gibraltar 288,274lbs. from France 252,222lbs. from Germany 122,150lbs. from America 10,567lbs. from Prussia 3,357lbs. and from Denmark 381lbs. making a total of nearly 18 millions and a half of pounds, of which nearly 15 millions and a half were imported in Spanish or neutral vessels, and the remainder in English vessels. His inquiries among the clothiers have enabled him to state the value of this quantity to be as follows:

	lbs.		£.
Sheep's wool, marked R (finest sort) - - - - - - - -	12,000,000,	at 6s.	3,600,000
Ditto, marked F (second sort)	2,000,000,	at 5s.	500,000
Ditto, marked T (third sort)	1,127,020,	at 4s. 6d.	253,579
Ditto, marked K (fourth sort)	14,920,	at 3s.	2,238
Lamb's wool - - - - - -	165,778,	at 4s. 3d.	35 227
In foreign vessels quantity	15,307,718lbs.	value	4,391 044
In English vessels quantity 3,160,000lbs. value according to the same proportions, for it could not be ascertained - - - - - - - - -			906,449

These accounts give the annual average of Spanish wool imported as exceeding 6,155,906lbs. weight, and the annual average value as upwards of 1,560,000*l.* sterling.

In the next succeeding chapter he proceeds to describe the Merino breed of sheep, which produce this valuable article of importation. Their native country is Spain: the number of them in that country is about five millions: they are divided into two sorts, those which travel from one part of the country to another, which are called Trashumantes; and those which remain always in the same pastures, named Estantes. The animal is described below the middle size, in comparison with English breeds, not very unlike the Ryeland, or old Southdown breed, and by no means furnished with that form which modern fashion has presumed to be inseparably connected with a disposition to early maturity and fatness. And though individuals differ much in these respects, yet the Merino sheep have generally their heads large and their necks long, their chests contracted, and being sharp on the shoulders, and flat-sided, and narrow across the loins. Against these defects, however, are to be added the peculiar quality of the skin, which is remarkably thin, soft, and loose, affording that evidence of a strong disposition to fatten, which many of our farmers call proof: the skin also differs from that of the native sheep of Britain, in being of a fairer hue, with a vivid tint of what is called carnation, or flesh colour, which tint is particularly conspicuous on those parts which are free from wool, as the eyelids and lips. With this peculiar condition of the skin, he considers to be connected the peculiar characteristic of the Merino race; namely—its fineness and flexibility; in which the Merino is superior to every other race of sheep in the world. This breed is literally buried in wool; it exists on their foreheads almost to the eyes, and on their cheeks, and entirely covers their bellies and legs. The length of the staple or filaments of wool is from two to more than three inches; the wool of the ram coarsest and longest, of the ewe finest and shortest; of the wedder, in both respects, between the two former.

It is stated from the publication of M. Lasteyrie, that the average weight of the fleece, unwashed, is about 5lbs. 7oz. English weight; but in the Compte rendu à la Classe des Sciences of Paris for 1802, 30 fleeces, recently imported, are said to have weighed, unwashed, 99 kilogrammes and a half, which is equal to 7lb. 5½oz. English, for the weight of each. This wool, however, was of thirteen months growth. Dr. Parry considers the weight, quoted from Lasteyrie, to be equal to the average of ewes' fleeces, and that it is probable the medium weight of rams' fleeces, in Spain, does not exceed seven pounds; though there is certainly great difference in the weight of particular fleeces.

The principal Merino flocks are then enumerated, both those belonging to the grandees and to the different societies of monks, which compose the corporation of the Mesta. The size of the Nigrette is stated to be superior; but it is said that the race of the Escurial is supposed to have the finest wool of all.

The difference between different flocks of Merino sheep, in Spain, and between different individuals of the same flock, is referred to the proportion of the grease, or yolk, which imbues all wool, but pre-eminently that of the Merino. From its superabundance in this particular breed, the fleece contracts, near its surface, a quantity of dust, earth, and other matters, so as to give the animal a dirty appearance; which usually is most manifest on the finest fleeces, as they contain the greatest quantity of yolk or grease; but notwithstanding this darkness on the surface, the wool when drawn asunder, nearer the skin, has a brilliant silky appearance, and, when scoured, is of the purest white.

The fleece is not washed for sale on the sheep's back, but after the wool is sorted; and usually loses three fifths of its weight in the operation, and some authors assert that the loss is often two thirds; and afterwards, in scouring by the clothier, an additional loss is sustained of about three, or three and a half, in twenty; but as the quantity of the yolk is different not only in different individuals, but in the same individual at different seasons, the loss in washing and scouring will proportionally vary.

It is remarked that the yolk of wool, here spoken of, has not escaped the notice of the French chemists: by an analysis of this substance by Vauquelin, published in the Annales de Chimie, it is found to contain a large proportion of fatty

matter united with potash, so as to form a natural soap; a smaller quantity of potash, combined partly with carbonic, partly with acetous, and partly with muriatic acid; a little lime, in a state of unknown combination; a small quantity of uncombined fatty substance; and a little animal matter which seems to produce the peculiar waxy smell: this yolk is supposed to be formed from the perspiration of the animal.

The wool of Merino sheep is also said to differ from that of all our native breeds, in being nearly of an equal fineness on the shoulder and the rump, though it grows more thickly on the latter part; and the whole fleece is remarkably free from those coarse hairs, usually styled snitchel hairs or cats' hairs; and the wool of the lambs is much coarser and harder than that of the sheep. The sheep themselves are longer in coming to maturity than most other breeds; they do not acquire their full growth till three years old, and the ewes rarely take the ram till they are eighteen or twenty months old, though the rams are fit for generation in a year: but the most striking particular in which the Merino race differs from every breed of short-woolled sheep, either in this or other countries, is, that while very few of the rams are polled, or have short snags, the majority have large spiral horns; and on the other hand, a horned Merino ewe is rarely to be found. The rams and ewes form separate flocks, in Spain, till the beginning of July, from whence they are suffered to continue together till the middle of August; one ram is generally allotted to twenty or twenty-five ewes. The ewes seldom produce more than one lamb at a birth, and seldom more than a fourth of these are permitted to be raised; the remainder are killed immediately as they are dropped, and by transferring the skin to another lamb, the mother is induced to adopt it, so that each lamb has two and sometimes three nurses. As the ewe-lambs are mostly preserved, the ram-lambs are but few, and are very rarely castrated: the wedders are rams on whom this operation has been performed at six or seven years of age, when they are no longer fit for propagation. So little are these sheep considered an article of food, that though immense flocks of them pass through or near Madrid twice every year, the mutton of that capital is supplied from Africa, as the beef and pork are from the neat cattle and pigs of France.

In the winter, the Merino flocks cover the plains of the fertile provinces of Valentia, Murcia, Arragon, Castile, La Mancha, Andalusia, Estremadura, and the neighbourhood of Cadiz; but when the herbage is wasted by the increasing heat of the sun, which generally happens in April, or the beginning of May, the flocks commence their journeys to the mountains of Leon, Castile, Navarre, Arragon, Segovia, Burgos, the Asturias, and other elevated districts. These journeys are conducted with much order, and are minutely described in the essay. During this journey the shearing takes place: when the weather is fine, the sheep are conducted to the esquilcos, or shearing-houses, which are usually on the mountains near the roads; they are kept for a day previous in a sudadcos, or sweating-house, in which they are so crowded as to have scarce room to move, or even to breathe; and though this practice has for its pretended object an increased facility of shearing, yet it is probably meant to augment by perspiration the weight, and consequently the price of the fleece. One with another each man shears fifteen sheep in a day; and if by accident the skin is wounded, they drop on the part a little powdered charcoal to heal the wound and guard it against the fly. When the fleeces are shorn, they are put into a damp warehouse, all the doors and windows of which are closely shut, so as not to admit any transmission of vapour; and this warehouse is not opened till the merchant comes to weigh the fleeces. The Spanish flocks occasionally suffer much from shearing; and that of the count del Campo Alange is reported to have lost five or six thousand in a single night. The shearing lasts three or four weeks, after which the sheep proceed on their journey, and remain on the mountains till the return of winter, when they are driven back again to the plains. It is customary to give all the sheep in Spain, whether Trashumantes or Estantes, a small quantity of salt, but the former have it only when in the mountains.

The wool in sorting is divided into four parts: the first, which is called by the Spaniards refina, or floreta, and which is marked R, is taken from the flanks, the back as far as the tail, the shoulders, and sides of the neck;—the second, or fina, marked F, comprises the wool of the top of the neck, the haunches as far as the line of the belly, and the belly itself; the third, tercera, marked T, is that of the jaws, the throat, the breast, the fore-legs to the knees, and the hinder thighs from the line of the belly down to the hocks;—the fourth, or cahidas, marked K or C, is that below the hocks, between the thighs, the tail, the buttocks, the pole, and behind the ears, and all that which shakes out of the fleece in shearing or in washing. A set of bags, containing the whole of the first three sorts, is called a pile, the proportion of which many years ago was R 15 parts, F 4, and T 1; the profit arising from the sale of the cahidas, or fourth sort, is said to be allotted for the consolation of souls in purgatory. When the wool is sorted, it is reduced by washing in hot water to the state in which it is imported into this country.

Of the five millions of sheep in Spain, the Estantes, or stationary part, are said to be about one tenth; and though there is in Spain, as in England, a prepossession in favour of the effect of travelling on the fleece, which the great proprietors encourage, yet it is asserted, on the authority of Bourgoanne and Lasteyrie, that several of the stationary flocks yield wool equal in excellence to the best of the Trashumantes; in Estremadura and Segovia there are flocks which never travel, the wool of which is not inferior to that of the other sort.

The diseases to which the Merino breed is chiefly subject, in Spain, are said to be the scab, giddiness, and an eruptive infectious disorder, like the small-pox, fortunately unknown in England, and for which we have no name. The Spanish shepherds do not employ any remedies worthy of notice for the cure of these maladies, unless it be of importance to announce, that when other means fail, they have recourse to magic.

Every thing respecting the maintenance of the flocks in Spain, as well Merinos as others, is directed by a code of laws called the Mesta, which first received the sanction of government about the year 1450.

The author proceeds to state, that he has looked in vain into writers for any plausible explanation of the name Merino, or any authentic history of the origin or introduction of the race itself. By some, he observes, it is attributed to England, and sup-

posed to be derived from the Cotswold breed; but from an inquiry into the quality of English wool, cloth, and sheep, from the earliest times to the latter end of the seventeenth century, he is of opinion that the Merino breed was not derived from Britain. It is also given as the opinion of the best informed writers, in which Dr. Parry himself concurs, that they were not originally brought from Africa, though this is strongly maintained by a writer in the French Encyclopedie, who boldly asserts that this race was formed about the time of the emperor Claudius, from the importations of African rams, by Columella, uncle to the celebrated agriculturist of that name. That the encyclopedist was evidently mistaken is proved by a quotation from the seventh book of Columella's Treatise De Re Rusticâ; it appears, however, that the Roman agriculturist tried many experiments to obtain fine-woolled coloured lambs, by coupling coarse-coloured rams, which he obtained from Africa, with white fine-woolled ewes; but it does not follow from his words (*in agros transtulit*) that Columella placed those rams on any lands of his in Spain. Dr. Parry thinks it much more probable, even from the words themselves, as well as from the nature of his object, that he brought them into the Roman territories in Italy, where there was abundance of the *oves molles*, the *oves tectæ*, which were chiefly valued for fine white wool. For among the Romans all ranks of people, of both sexes, wore chiefly woollen garments, a pound of silk, even in the reign of Aurelian, at the close of the third century of the Christian era, being, according to Vopiscus, equal in value to a pound of gold. And when the pre-eminence in wealth and the prevailing vanity of the Romans are considered, and since the heat of Italy is so great at certain seasons of the year as scarcely to admit the use of a woollen dress, the doctor is of opinion, that the quality of the wool must have been a matter especially important, since, during the Augustan age, and for a considerable time afterwards, it was the fashion to wear cloth furnished with a nap or pile. It is recalled to the recollection of the reader, that Varro, Columella, Pliny, Martial, Palladius, Petronius, and Calpurnius Siculus, agree in stating that the sheep which produced the finest wool in the Roman dominions were those of Apulia and Calabria. A pound avoirdupois of this wool is stated to have cost about 1*l.* 1*s.* 7*d.* of our money. And even at this time, according to Pliny, and some other ancient authors, Spain was not without valuable breeds of sheep, which were memorable for bearing fleeces naturally of different tints. Columella speaks of them as bearing blackish or tawny coloured fleeces; Pliny, who lived somewhat after him, adds, that they were occasionally of a reddish or gold colour, like those of Asia; and Martial compares them with the golden or red hair of women. The opinion of Strabo, with respect to the Portuguese sheep, is then examined, and it is clearly made out, that the wool of them was more like hair, and incapable of being manufactured into cloth with a nap or pile. The historians of Spain, who had been diligently consulted for the purpose, afforded him no information on the subject.

From all these circumstances he concludes, that however the notion of the English origin of the Merino breed of sheep may serve to flatter the national pride, yet that it falls to the ground as soon as it is investigated; and also that it is not more probable that the race was introduced into Spain from Barbary, as asserted by the French encyclopedists: but, adverting again to the attention which the Romans paid to their sheep, and particularly to that breed, which, from producing the fine short wool, was much valued, and the object of peculiar care on that account, he thinks it probable that the race of short-woolled sheep of the ancient Romans, and the present race of Merino sheep of Spain, are the same: for the perfection of both these breeds, he observes, seems to have consisted in certain common qualities. "The favourite ewe of ancient Italy was to have a large carcarse, capacious belly, short legs; and the ram a wide breast, shoulders and buttocks, a long and deep body, and a broad and long tail. The fleece was to be thick, soft, and deep, especially about the neck and shoulders. It seems to have been with a view to the increase of wool on this finest part of the animal, that the Romans thought a long neck valuable in the ewes: the ears and forehead of the rams were to be involved in wool, and no individual of either sex was tolerated, of which the wool did not clothe the whole belly. Regard was also had to the horns: it is a memorable circumstance in these sheep, that the rams had generally horns, and the ewes none; still however the polled rams were most esteemed."—"It is impossible for any one who reads this description," says Dr. Parry, "and who is acquainted with the improved Merino race of the present day, not to suspect that they are one and the same breed."

He then proceeds to investigate evidence as to this fact. he observes, that throughout Europe, as far as he knows, there is not any short-woolled breed besides the Merinos existing, except in Italy, of which the males are horned and the females not: that in former times the sheep of Apulia and Calabria had their different summer and winter quarters, the same as the Merinos now have in Spain; it was also the universal practice among the Romans to give salt to their sheep, with a view to promote appetite and thirst, to increase milk, and to improve digestion; and he can hardly believe that this practice, which still subsists in Italy, should from time immemorial have found its way into Spain, and into that country only, except by immediate communication: and as the Spanish flocks are frequently led by goats in the present day, so it appears, from Tibullus, this was a common usage among the Romans. Dogs follow the flocks in Spain as well as in most other countries; they are however not intended, as in England, France, and most other European districts, to assist the shepherd in guiding and regulating the sheep, but are of a strong and fierce kind, serving to guard and protect both against the depredations of robbers and beasts of prey: so also dogs were kept by the Romans for the same purposes, the qualities, uses, and treatment of which are minutely described by Varro and Columella. Many of these instances, it may be said, may have been coincidences of practice, suggested by similarity of circumstances, but could not have been the reason why, in order to avoid variegated fleeces in the offspring, both nations should exclude rams with spotted mouths or tongues from the privilege of breeding; a practice which is stated to have prevailed among the Romans, upon the authority of Varro and Columella, and to be adhered to by the modern Merino shepherds, on the authority of Lasteyrie. A still more remarkable coincidence is noticed, which is the practice of killing a considerable number of lambs very shortly after they are dropped. This custom prevailed equally with the Romans as it does with

the present Spaniards, and precisely from the same motives;—that as the wool only was the valuable produce of the flock, each lamb might acquire more strength by having two nurses.

This agreement then in so many important particulars of form, fleece, constitution, and general treatment, satisfies the author of the Essay beyond all reasonable doubt, that the present Merinos are the same race as the ancient Tarentine sheep of Apulia; yet he can find no evidence of the time when they were first introduced into Spain. For though the union of Italy and Spain first took place under Frederick, king of Arragon and Sicily, about the beginning of the fourteenth century, yet it is not in Arragon that the best Merino sheep are now found; and the author conceives that the circumstances of the history of Spain would rather induce a belief that their introduction took place at a more remote period than 1300: he leans to the idea of their having existed in that country during the dominion of the rich, industrious, and luxurious Moors, if not in still earlier times, when Spain was under subjection to Rome.

Dr Parry, having thus completed his observations on the nature, produce, and origin of the Merino breed of sheep, concludes the first part of his Essay by remarks on the extension of the race to various parts of the world

The Swedes are stated to be the first nation in Europe, who imported Merino sheep with a view to naturalize them; though the most northern part of this country is burnt up during a short summer by a sun which never sets for many days, and the whole is desolated by a winter of seven or eight months, during which the ground is covered with uninterrupted snow. Notwithstanding this it is stated, that M. Alstroemer introduced a flock of Merino sheep into Sweden in 1723, and that under his direction the government instituted a school of shepherds in 1739, and granted bounties of 25 per cent. to the sellers of fine and good wool; these, however, were reduced to 15 per cent. in 1781, to 12 per cent. in 1786, and in 1792 where wholly discontinued. The Merino sheep now in Sweden are estimated at 100,000, or about one twenty-fifth part of the sheep of the country, and the wool is in every respect equal to that of Spain; the size of the animal has in many cases degenerated, but the wool produce has proportionally increased; and the Swedes raise at present in their own country nearly as much fine wool as is sufficient for their manufactures. The more attentive cultivators lodge their sheep during the whole year in large airy buildings, the windows of which are always open, and the doors made of hurdles, and they are driven out twice in the day; the daily allowance of food given to each is two English pounds of hay, with an addition of dried leaves of trees, stalks of the hop, pease-haulm, and oat and barley straw; but many only house them at night for security against the wolf and the lynx. The sheep are allowed salt in damp or rainy weather; and the shearing takes place in July, the sheep having been previously washed: the average weight of well-washed ewes' fleeces is given at full three pounds, and of lambs' fleeces at one pound.

The Danes first carried Merino sheep from Sweden in 1789, a few descendants of which remain; and in 1797 the government of Denmark imported 300 sheep from Spain, from the celebrated breeds of the Escurial, Gaudaloupe, Paular, Infantado, Montano, and Negrette: these were placed at Esserum, eight leages from Copenhagen, and were all alive, except two, eighteen months afterwards, when they were seen by M. Lasteyrie. They are kept in airy houses, and fed with hay, or rye and oat straw cut into chaff; they are fed three times a day with an allowance in the whole of 3½ pounds of dry food, and in warm weather are sent out into enclosed pastures without a shepherd: salt is given them in wet weather, and some persons give them the heads of salt herrings, or the brine which has been used for pickling meat or fish; the lambs are weaned at three months, and are then allowed the best pastures.

Augustus Frederick, elector of Saxony, introduced Merino sheep into his dominions in 1765: the number was three hundred, divided into four establishments; and at the end of ten years they were found to have had all possible success; the sheep of the pure blood preserving every valuable quality, and the ultimate crosses having wool fully equal to the pure Merinos. The winter food of this race in Saxony consists of hay, lattermath, clover, oat or rye straw, pease-haulm, vetches, &c. which are given twice or thrice in the day in large buildings, but in summer the sheep are only housed at night, and kept from the pastures till the dew is dissipated. Salt is very generally distributed to them by the Saxons, from an idea that it contributes to their health and to the fineness of their fleeces The lambs fall before March, and are weaned in June; the sheep are washed before shearing in running water two successive days, suffered to dry for two days, and are shorn on the third, which generally takes place in May. Saxony no longer imports Spanish wool; and much of that grown there has been sent for some years to the fairs at Leipsic, and part of it imported into England. It is said to be allowed by manufacturers, who have tried this wool, that it makes cloth superior in softness and fineness to any obtained from the best Spanish piles.

The Merino breed of sheep was first introduced into Prussia by M. Finck in 1768, who obtained his original stock from Saxony; but in 1779 he imported three rams and twenty ewes directly from Spain. Though he has carefully maintained the pure race, yet he has chiefly employed his rams in improving the native breeds. The count de Magnis also possesses, at Eckersdorff in Silesia, a flock of nine thousand sheep by the Merino cross. His attention has been directed to uniting size with fineness of wool; he has therefore mixed the best Merino rams with the large breed of Hungary, and in this respect has made great progress, one sheep with another giving three pounds of washed wool, on a carcase larger, stronger, and better formed than any other fine woolled sheep on the Continent. The times of yeaning, and the treatment of these flocks in Prussia and Silesia, are so nearly the same as what prevails in Saxony, as not to deserve a separate notice: most of the farmers in Prussia allow their sheep to go out during the day in the severest weather, and give them dry food during the night. The count de Magnis gives his sheep corn, but considers it as too expensive; he regards potatoes as equally beneficial with oats, and certainly much cheaper; and during the winter his sheep eat as much salt as they choose.

The war with Austria prevented M. Lasteyrie from visiting that country and some other parts

of Germany; the information therefore which Dr. Parry is able to give, concerning their Spanish flocks, is very limited and imperfect. He relates however, from Lasteyrie, that the empress queen Maria Theresa imported Merino sheep from Spain in 1775, and placed them at Mercopoil in Hungary; and that subsequently to that period two other flocks have been brought from Alicant to Trieste: and in 1802 a person was employed by the emperor to purchase sheep in Spain. In Anspach and Bayreuth attempts are noticed to improve the native sheep by the introduction of Merinos; and in Mecklenburgh, Zell, Brunswick, Baden, and Hanover, this race has been long enough introduced to improve the wool of those countries in a considerable degree.

It is remarked, that few countries appear less adapted to the support of sheep than the rich and marshy soil of Holland; yet in 1789 M. Trent imported from Spain two rams and four ewes, and placed them on an estate between Leyden and the Hague; in 1793 he imported three new rams and four ewes; and in 1802 his flock amounted to one hundred. His rams' fleeces weighed from 10 to 14 pounds, and his ewes' fleeces from 6 to 10 pounds, in an unwashed state. To prove the fineness of his wool, he placed on a piece of black cloth nine specimens of his own wool by the side of the best specimens of superfine Spanish which he could procure, and sent them to a clothier, who pronounced five of M. Trent's specimens to be superior to the superfine Spanish. In 1793 M. Cuperus, near Leyden, also imported some Merinos from Spain into Holland, and his crosses of the native breeds were in 1802 nearly equal to the unmixed Spaniards in fineness of fleece.

Piedmont appears to Dr. Parry to have first obtained the Spanish breed of sheep in 1793, when prince Masserino chose 150 ewes from the best flocks of Segovia. Notwithstanding the war which existed at the time, they increased considerably, and many crosses were obtained from the ewes of Germany, Rome, Naples, and Padua. The greater part of the proprietors agreed to form a society, and in 1801 obtained from the government of France, to which Piedmont was then annexed, a grant to improve, under certain conditions, the plains of La Mandria: the laws for the regulation of the flocks of this society are given by M. Lasteyrie. The management of the Merino flocks of Piedmont appears to vary but in few particulars from the modes which have been previously described. The cultivators of the plains of La Mandria drive their flocks to the Alps from the middle of June to the end of October; they are seldom folded except in the mountains, experience having shewn that their dung in the house is more profitable, provided they are supplied with a proper quantity of straw.

"There is, however," says Dr. Parry, "no country in Europe which of late years has taken so much laudable pains in cultivating the Merino breed of sheep as France." For though it appears that Spanish sheep had been imported into France at an early period, yet the first person who paid any systematic attention to the wools of that country, by this method, is said to have been Daubenton, who in 1776 obtained part of 200 Merinos imported by M. Trudaine, intendant of the finances. The flock of Daubenton is now in the possession of M. Thevenin of Tanlay, and produces wool of the very first quality. In 1786 about 400 Merino sheep were presented by the king of Spain to Louis XVI. but 60 of them died on their journey, and a greater number fell a sacrifice to the febrile disease before mentioned, similar to the small-pox, after their arrival at Rambouillet. This royal present, having been chosen for their form and fleece from various Spanish flocks, differed much both in size and shape; but having been better assorted after their arrival in France, produced a race unlike any of the original breeds, but equal to the best of them in mould and fineness of wool, and superior in weight of carcase and of fleece. A particular account is given of this flock, which was placed under the direction of an agricultural committee at the commencement of the French revolution, who made an annual report to the National Institute on the subject. From the report of the year 1802 it is stated, on the authority of Lasteyrie, that the medium weight of the fleeces of full-grown nursing ewes was about 8lb. 7oz.; of the ewes of three years old, which had no lambs, about 9lb. 13oz.; of the two-tooth ewes about 10½lb; and of the rams of three or four years old about 11lb. 5¼oz.: each fleece selling on an average at the price of about 1l. 3s. 4d. sterling. Dr. Parry has seen several specimens of the Rambouillet wool of 1802, and indeed is in possession of some of it; and, as far as he can judge of their quality by the naked eye, he considers them to be equal to the Ryeland wool of the Spanish piles. It is stated that, by a secret article in the treaty of Basil, the French Directory had stipulated for itself the privilege of purchasing in Spain 1000 ewes and 100 rams in each of the five succeeding years. From the Rambouillet flock many others have been established in France and its dependencies, none of which is said to be more justly entitled to general notice than that of M. C. Pictet, of Geneva, who established a Merino flock in 1800; and besides these pure Spanish flocks, there are many others of a mixed breed, which have originated from experiments made by individuals, the result of which is said to be, that, with due care, the wool in every breed of sheep is capable of arriving at a degree of fineness equal to that of the Merino, and that the effect is produced by constantly crossing with the finest woolled rams, and is generally obtained sooner or later according to the fineness of the fleece of the ewe, but in no breed later than the fourth cross.

From the account which he has given, it appears to the author of the Essay that the Spanish breed of sheep has been much improved in weight, and probably fineness of fleece, and has considerably increased in size, by having been naturalized in France; and he thinks these valuable points have been accomplished in the four following ways: 1. By choosing for breeding the finest and best woolled rams and ewes;—2. By never allowing them to propagate till they have attained their full growth, which, at the earliest, is not till nearly three years of age;—3. By separating the weak from the strong;—4. By giving them good food, and plenty of air and exercise. A particular account of the mode of feeding and treating them is subjoined in illustration of this opinion, which is too extended to be comprised in this analysis.

It is next remarked, on the authority of count Alexis Orloff, that Merino sheep have been imported into Russia, but no information is given of the result. With respect to this breed at the

Cape of Good Hope, some particulars are communicated from the information of sir George Yonge, who was governor there; and the author having once had a ram of the native Cape breed, speaks from his own knowledge that the wool chiefly consists of long coarse filaments like hair; this has been very much improved by a cross of Merino rams; and Dr. Parry speaks of a specimen of wool from the fourth cross of the native Cape sheep, which he had obtained from sir George Yonge since his return to England, as having a filament so fine, that the next cross would produce wool fully equal to good Spanish.

From these Cape Merinos sprung a race of sheep, which were carried from thence in 1797, by captain M'Arthur, to the English settlement on the coast of New Holland; and a memorial presented by that gentleman to the English government in 1783 is added, to evince his sanguine expectations that wool might be produced there from the Merinos, which would be superior to Spanish wool; and some samples which he brought over and gave to Mr. Joyce, of Freshford, near Bath, were equal in fineness to any he had ever manufactured.

Though it is admitted that Merino sheep have been at various times imported into Great Britain, yet the plausible tales of the French encyclopedists on this point are shewn to have no foundation in truth; and the sheep of this breed, which have been imported in modern times, are believed to be very few, till the king obtained some Merino sheep in 1792; in which year he purchased five rams and thirty-five ewes from the flock of the countess del Campo Alange, which is called Negrette. The management and distribution of this flock through the country by periodical sales are then amply detailed; but these are circumstances too generally known to make their insertion necessary in this place. The most ample information of the progress of the royal Merino flock of England may be obtained from the Reports of sir Joseph Banks, under whose care the flock is placed, and through whose judicious management, it is asserted, the farm has been considerably improved, and the fleece rendered finer than the Negrette pile, the wool of the parent stock in Spain.

The exertions of lord Somerville to introduce Merino sheep are next noticed, with appropriate commendations of his judgment and zealous activity in all agricultural pursuits; and he is said to have treated his flock so successfully, that the cloth manufactured from his wool is superior to the greater part of that manufactured from Spanish, and the carcase at the same time is fast approaching to best Ryelands or South-downs. The Merino flocks of lord Portchester and Mr. Tollet, which have been formed from those of the king and lord Somerville, are also mentioned; and it is added, that, besides these larger flocks, there are in the kingdom many smaller ones of Merino sheep which the author cannot particularize; but it appears to him that the principal mode in which the utility of the Merino race has been extended in England, has been by crossing our native breeds with Merino rams. The cross with Ryeland ewes is supposed to be that most frequently resorted to, and several gentlemen are named, who were zealously employed in promoting the cross with the Ryeland, the South-down, and the Wiltshire breeds.

MERIONETHSHIRE, a county of North Wales, 36 miles long and 34 broad; bounded on the N. by Carnarvonshire and Denbighshire, on the E. by the latter county and that of Montgomery, on the S. by Cardiganshire, and on the W. by the Irish sea. The face of this county is varied throughout with a romantic mixture of all the peculiar scenery belonging to a wild and mountainous region. The principal rivers are the Dee and Dovy; and it has a great mountain, the Cader Idris, one of the highest in Wales. Merionethshire contains six hundreds, four market-towns, 37 parishes, and sends one member to parliament. Harlech is the capital.

ME'RIT. *s.* (*meritum*, Latin; *merite*, Fr.) 1. Desert; excellence deserving honour or reward (*Dryden*). 2. Reward deserved (*Prior*). 3. Claim; right (*Dryden*).

To ME'RIT. *v. a.* (*meriter*, French.) 1. To deserve; to have a right to claim any thing as deserved (*South*). 2. To deserve; to earn (*Shakspeare*).

MERITO'RIOUS. *a.* (*meritoire*, French.) Deserving of reward; high in desert (*Sanderson.*)

MERITO'RIOUSLY. *ad.* In such a manner as to deserve reward (*Wotton*).

MERITO'RIOUSNESS. *s.* (from *meritorious.*) The act or state of deserving well (*South*).

ME'RITOT. *s.* A kind of play (*Ainsworth*).

MERLIN (Ambrose), a famous English poet and reputed prophet, flourished at the end of the 5th century. Many surprising and ridiculous things are related of him. Several English authors have represented him as the son of an incubus, and as transporting from Ireland to England the great stones which form Stonehenge on Salisbury plain. Extravagant prophecies and other works are also attributed to him, on which some authors have written commentaries.

MERLIN, in ornithology. See FALCO.

MERLON, in fortification, is that part of a parapet which is terminated by two embrasures of a battery. See FORTIFICATION.

MERLUCIUS, in ichthyology. See GADUS.

MERMAID, or MERMAN, a fabulous sea-creature, frequently talked of, supposed half human and half fish.

MERNS. See KINCARDINESHIRE.

MEROCELE. (*merocele*, μηροκηλη; from μηρος, the thigh, and κηλη, a tumour). A femoral hernia. See HERNIA.

MEROE, an island of Ethiopia, with a town of the same name. Its original name was Saba, and Cambyses gave it that of Meroe from his sister. Encompassed by watery boundaries so interesting in history, Meroe was celebrated for its profusion of precious metals, and of gems still more precious. It abounded beyond all countries in ebony; and with this valuable wood it abounds to the present day. In the flourishing age of the Ethiopians, it is said to have been defended by upwards of two hundred thousand soldiers, and enriched by double that number of industrious artizans. But the circumstance especially deserving regard is, that

it remained a theocracy, or sacerdotal government, down to the learned age of Ptolemy Philadelphus, when king Ergamenes of Meroe, who had imbibed enough of Greek philosophy to liberate him from cowardly superstition, but too little to teach him either humanity or good policy, massacred the collective body of priests, ministers of the golden temple, who had long and wisely governed both prince and people. Having committed this enormity, the usurper coerced by the arm of power a nation that had been immemorially governed by the mere force of opinion. Before a melancholy revolution, eternally fatal to the prosperity of Meroe, that island might be considered as the subsisting model of a government, anciently very prevalent, and which, without arms, and with few corporal punishments, overawed the minds of men, and concentrated their exertions, taught them to rear temples, and form sacred enclosures, haunts indeed of superstition, but seats also of industry and commerce, and which, by the labours of peace, adorned many parts of the ancient continent with great cities, before the iron age of conquerors and destroyers.

MEROPE. The most remarkable of this name is one of the Atlantides, who married Silphus, son of Æolus, and, like her sisters, was changed into a constellation after death. [See Pleiades.] It is said, that in the constellation of the Pleiades, the star of Merope appears more dim and obscure than the rest, because she, as the poets observe, married a mortal, while her sisters married some of the gods, or their descendants.

MEROPS, a king of the island of Cos, who married Clymene, one of the Oceanides. He was changed into an eagle, and placed among the constellations.—2. A celebrated soothsayer of Percosus in Troas, who foretold the death of his sons Adrastus and Amphius, who were engaged in the Trojan war. They slighted their father's advice, and were killed by Diomedes.

Merops. Bee-eater. In zoology, a genus of the class aves, order picæ. Bill curved, quadrangular, compressed, carinate, pointed; nostrils small, at the base of the bill; tongue slender, the tip (generally) jagged; feet gressorial. Twenty-six species: one only, the common bee-eater, found in our own country; the rest scattered over India, Africa, and the south of Europe.

M. apiaster, or common bee-eater, is chiefly worth describing. Independently of England, it is found in other parts of Europe, in Asia, Africa, and America. It derives its name from the food on which it chiefly subsists, such as bees, wasps, and other large insects; which, like the swallow, it catches while they fly. In the island of Candia, the boys take it by baiting a hook fastened to a string, with an insect; which, as soon as perceived, it greedily swallows, together with the hook, and is thus secured like a fish in the water. When insects fail, the bee-eater can subsist on grain; for the trituration of which, he swallows small stones, like all other granivorous birds. Bee-eaters, though extremely numerous in Candia, are not frequently seen in Greece or Italy. Willoughby mentions, indeed, that he saw some exposed to sale in the markets of Rome. They are frequently observed in the south of France, where they are seen alighting on the fruit-trees, while in blossom, watching the bees and wasps that come to feed upon them. They traverse as far north as Sweden, and are spread in the temperate zone, from Judea to Bengal.

The bee-eater, like the bank-swallow and king-fisher, nestles in the bottom of holes dug with its strong claws; and sometimes in the sandy banks of large rivers, where it frequently digs to the depth of five feet below the surface.

These birds are celebrated by Aristotle, Pliny, and Ælian, for their parental affection. They allege, that they are no sooner able to fly, than they consecrate their labours to the service of their parents, supply them with food, and anticipate all their wants. This, however, is merely a fable, which appears to have been often copied, for the sake of the moral. The head and neck of the common species are chesnut, of which the latter always grows brighter as it approaches the back. The upper part of the body is pale yellow, with reflections of green and chesnut, more or less visible, according to the point from which it is viewed. The lower parts are azure, brightening towards the tail. The bill is quadrangular, a little bent, and sharp at the point. Of the toes, three are forward, and one backward; and of the three that are forward, the middle one is connected to the rest as far as the third joint.

There is, however, a second variety in which the toes are not connected so far as the third joint, and possessing a convex instead of a carinate bill. The bird is gregarious, and lays from five to seven white eggs, ten inches long.

The other species do not essentially differ in their manners so far as these have been observed. One of the handsomest is M. viridis, or Indian bee-eater, of a green colour, with a black belt on the breast, and the throat and tail of the same hue. It inhabits Bengal; and offers several varieties.

MEROS, a mountain of India sacred to Jupiter. It is called by Pliny Nysa. Bacchus was educated upon it, whence arose the fable that Bacchus was confined in the thigh (μηρος) of his father.

MERRILY. *ad.* (from *merry.*) Gayly; airily; cheerfully; with mirth (*Granville*).

MERRIMAKE. *s.* (*merry* and *make.*) A festival; a meeting for mirth (*Spenser*).

To Me'rrimake. *v. n.* To feast; to be jovial (*Gay*).

MERRIMENT. *s.* (from *merry.*) Mirth; gayety; cheerfulness; laughter (*Hooker*).

MERRINESS. *s.* (from *merry.*) Mirth; merry disposition (*Shakspeare*).

ME'RRY. *a.* 1. Laughing; loudly cheerful; gay of heart. 2. Causing laughter (*Shakspeare*). 3. Prosperous (*Dryden*). 4. *To make* Merry. To junket; to be jovial (*L'Estrange*).

Merry-andrew. *s.* A buffoon; a zany; a jack-pudding (*L'Estrange*).

MERRY-THOUGHT. *s.* (*merry* and *thought.*) A forked bone on the body of fowls (*Echard*).

MERSE. See BERWICKSHIRE.

MERSENNE (Marin), in Latin *Mersennus*, a learned French author, born at Oyse, in the province of Maine, anno 1588. He studied at La Fleche at the same time with Des Cartes, with whom he contracted a strict friendship, which lasted till death. He afterwards went to Paris, and studied at the Sorbonne; and in 1611 entered himself among the minims. He became well skilled in Hebrew, philosophy, and mathematics. He was of a tranquil, sincere, and engaging temper; and was universally esteemed by persons illustrious for their birth, their dignity, and their learning. He taught philosophy and divinity in the convent of Nevers, and at length became superior of that convent; but, being willing to apply himself to study with more freedom, he resigned all the posts he enjoyed in his order, and travelled into Germany, Italy, and the Netherlands. He wrote a great number of excellent works; the principal of which are, 1. Questiones celeberrimæ in Genesim. 2. Harmonicorum libri. 3. De sonorum natura, causis, & effectibus. 4. Cogitata physico-mathematica. 5. La verité des Sciences. 6. Les questions inouies. He died at Paris in 1648. He had the reputation of being one of the best men of his age. No person was more curious in penetrating into the secrets of nature, and carrying all the arts and sciences to their utmost perfection. He was in a manner the centre of all the men of learning, by the mutual correspondence which he managed between them. He omitted no means to engage them to publish their works; and the world is obliged to him for several excellent discoveries, which, had it not been for him, would perhaps have been lost.

MERSEY, a river that runs through the counties of Lancaster, York, and Chester, and empties itself into the Irish sea at Liverpool. By the late inland navigation it has communication with the rivers Dee, Ribble, Ouse, Trent, Darwent, Severn, Humber, Thames, Avon, &c. which navigation, including its windings, extends above 500 miles, in the counties of Lincoln, Nottingham, York, Lancaster, Westmoreland, Chester, Stafford, Warwick, Leicester, Oxford, Worcester, &c.

MERSEY-ISLAND, an island of Essex, at the mouth of the Coln, south of Colchester. It was seized by the Danes in the reign of king Alfred, for their winter quarters. It had eight parishes, now reduced to two, viz. East and West Mersey. The island had a blockhouse; and in the Dutch war the parliament put 1000 men in it.

ME'RSION. *s.* (*mersio*, Latin.) The act of sinking, or thrusting over head (*Ainsworth*).

MERSPURG, a town of Suabia, in the bishopric of Constance, and the bishop's usual place of residence. It is seated on the N. side of the lake of Constance, 11 miles from the town of that name. Lon. 9. 26 E. Lat. 47. 45 N.

MERTHYR TYDVILL, a village in Wales, not far from Neath, which less than 20 years ago was an insignificant place; but has since by its noble iron works become one of the most remarkable spots in that principality. These works, which are known under four different names, Cyfartha, Pennydarran, Dowley, and Plymouth works, and which belong to as many proprietors or companies, are all situated within the compass of three English miles in length and two in breadth. Within this narrow circuit there are 13 iron forges; which upon an average produce 40 tons of pig-iron per week, and 20,000 tons annually of bar and hoop iron. About 4000 workmen are regularly employed at these works.

MERTOLA, a strong town of Portugal, in Alentejo, seated near the Guadiano, 60 miles S. of Evora, and 100 S.E. of Lisbon. Lon. 7. 40 W. Lat. 37. 30 N.

MERTON, a village of England, in the county of Surry, on the river Wandle; where was once a celebrated abbey, anciently famous for the death of Kinulphus, king of the West Saxons, killed here by Kinehard Clito, in the small hut of an insignificant harlot, of whom he was violently enamoured. Kinehard himself was afterwards slain by the friends of Kinulph; and thus suffered the instant punishment of his treachery. At present this place shows only the ruins of a monastery, founded by Henry I. at the instigation of Gilbert, sheriff of Surry, and famous for the parliament held at it under Henry III. the day after his coronation, in which were enacted the provisions of Merton, which are the most ancient body of laws, after Magna Charta, and consist of eleven articles. In this assembly, upon a motion of the bishops for establishing a constitution of the canon law, by which marriage could legitimate issue previously born, the lay lords made that celebrated answer, *Nolumus leges Angliæ mutari.* Walter de Merton (probably a native of this place) bishop of Rochester, and chancellor of England, had begun his college, on his manor of Maldon, here, in 1274, but ten years afterwards removed it to Oxford, and died about four years after. It is now become considerable for its calico-printing and bleaching: four miles E. Kingston, and nine S. London.

MERULA (George), an Italian of extraordinary parts and learning, born at Alexandria in the duchy of Milan, about the year 1420. He taught youth at Venice and Milan for 40 years, and laboured abundantly in restoring and correcting ancient authors. He wrote, and addressed to Lewis Sforza, *Antiquitates Vicecomitum*; or The Actions of the Dukes of Milan, in 10 books; with some other things in the same way. His death, in 1494, is said not to have grieved any body, as he lived in a state of war with, and abused, almost all his cotemporary scholars.

MERULA (Paul), born at Dort in Holland, a famous lawyer, historian, and linguist, was professor of history in the university of Leyden after Lipsius. He wrote, 1. Commentaries on

Ennius; 2. The Life of Erasmus and Junius; 3. A cosmography; 4. A treatise of law; and died in 1607.

MERULA, or BLACKBIRD, in ornithology. See TURDUS.

MERULIUS, in botany, a genus of the class cryptogamia, order fungi. Fungus with veins underneath. Twenty species; of which eleven are indigenous to our own country: of these some are stemless, some possessed of stems.

MES-AIR, in the manage, half a TERRA A TERRA and half a CORVET. See those articles.

MESARAIC VESSELS, in the general sense, are the same with mesenteric. In common use, however, mesaraic is more frequently applied to the veins, and mesenteric to the arteries, of the mesentery.

MESAULICI. (Greek.) Interpipings. The name applied by the ancients (as supposed by Meibomius) to the interacts, or pieces performed between the divisions of their drama.

MESCOLOMENTO, or MISTIO. A term used by the ancient Greeks, signifying that branch of the *melopœia*, which gave the rules for so arranging the sounds of a melody, that the voice or instrument might be kept within a certain compass: and that the three genera might be so disposed that the air should never move out of the system in which it begun, unless with some particular design.

MESE. A term applied by the ancient Greeks to the sound that completed their second tetrachord, and which was the centre of their whole system. The Mese was an octave above the *proslambanomenos*, or lowest sound, and answered in some respects to the key-note in modern music. It was also the name given to the central string of the lyre.

MESE'EMS. *impersonal verb.* I think; it appears to me (*Sidney*).

MESEMBRYANTHEMUM. Ice-plant; Fig marigold; Egyptian kali. In botany, a genus of the class icosandria, order pentagynia. Calyx five-cleft; petals numerous, linear, slightly united at the base; capsule fleshy, inferior, many seeded. Eighty-six species: one a native of Egypt; two or three of Australasia; the rest of the Cape. They may be thus subdivided.

A. without stem.
B. with a very short stem.
C. with a stem and flat leaves or none.
D. with a stem; leaves convex underneath.
E. with a stem; leaves cylindric.
F. with a stem; leaves three-sided.

Of this extensive tribe the following are the chief. 1. Mesembryanthemum, with taper, obtuse, hairy leaves, placed alternately, called the Egyptian kali. 2. Mesembryanthemum, with oval, obtuse, waved leaves, placed alternately, commonly called the diamond ficoides, diamond plant, or ice plant. 3. Mesembryanthemum, with half-taper leaves, and flowers fitting close to the wings of the stalks. 4. Mesembryanthemum, with half-cylindrical leaves, and quadrifid flowers. 5. Mesembryanthemum, with awl-shaped, three-cornered leaves, an erect stalk, and a corymbus of flowers at the triple division of the stalk. 6. Mesembryanthemum, without a stalk, with half-taper leaves, which joins at the base, and flowers with eight styles. 7. Mesembryanthemum, with plain, spear-shaped, crenulated leaves. 8. Mesembryanthemum, without a stalk, with narrow, three-cornered leaves, marked with three indentures at their points. 9. Mesembryanthemum, having stalks, and three-cornered, indented leaves, which are shaped like the Greek delta. 10. Mesembryanthemum, with the points of the leaves bearded. 11. Mesembryanthemum, with a prickly stalk, and deflexed, cylindrical leaves. 12. Mesembryanthemum, with the stalks and leaves garnished with downy hair. 13. Mesembryanthemum, with awl-shaped leaves, which are every where rough on their under-side. 14. Mesembryanthemum, with the joints of the stalks terminated by acute, pointed leaves, which are indented on their under-side, commonly called buckshorn ficoides. 15. Mesembryanthemum, with branching spines. 16. Mesembryanthemum, with awl-shaped, prickly leaves, and a headed root. 17. Mesembryanthemum, with awl-shaped, half taper, smooth leaves, which are longer between the joints. 18. Mesembryanthemum, with awl-shaped, cylindrical leaves, having distinct, dark-coloured pimples. 19. Mesembryanthemum, with a creeping stalk, which is half cylindrical, and with half-cylindrical, smooth leaves, joining at their base, and their points three-cornered. 20. Mesembryanthemum, with distinct, smooth, falchion-shaped leaves, and taper branches. 21. Mesembryanthemum, with falchion-shaped leaves, connected at their base, with the keel-shaped angle rough, and with angulated branches. 22. Mesembryanthemum, with rough, three-cornered leaves, and petals to the flower, which are of two colours. 23. Mesembryanthemum, with awl-shaped, three-cornered leaves, and with the keel-shaped angle, sawed on the outside. 24. Mesembryanthemum, with awl-shaped, cylindrical leaves, which are pimply and distinct, and a rough stalk. 25. Mesembryanthemum, with linear, obsolete, three-cornered leaves, which are distinct and smooth, and imbricated at the top. 26. Mesembryanthemum, without a stalk, with half-cylindrical leaves, which have tubercles on their outsides, and are joined together. 27. Mesembryanthemum, with acute, cylindrical leaves, connected together at their base, bowed and smooth. 28. Mesembryanthemum, with awl-shaped, three-cornered leaves, marked with obsolete, pellucid punctures. 29. Stalky Mesembryanthemum, with awl-shaped, semi-cylindrical, recurved, long leaves, which are connected at their base. 30. Mesembryanthemum, with plain, oval, acuminated, entire leaves, which are placed opposite, and connected together at their base. 31. Mesembryanthemum, with a short stalk, and leaves having hairy indentures, commonly called dog's chap ficoides. 32. Mesembryanthemum, with axe-shaped leaves. 33. Mesembryanthemum, with disarmed leaves. 34. Mesembryanthemum, without a stalk, with

tongue-shaped leaves, the borders of which are thicker on one side. 35. Mesembryanthemum, with alternate, awl-shaped, three-cornered, very long leaves.

Culture.—These species are all of them natives of Africa, and have beautiful flowers, which appear at different seasons of the year, some of them flowering early in the spring, others in summer, some in the autumn, and some even in winter. The first and second species are annual plants; the first grows naturally in Egypt, and does not perfect seeds in this country; the second sort is a native of the Cape of Good Hope, and is propagated for the singularity of its leaves and stalks, which are closely covered all over, with a multiplicity of pellucid gems or pimples, full of moisture, which, when the sun shines on them, reflect the light, and appear like small bubbles of ice, or a bed of diamonds, whence the names of ice-plant and diamond-plant. This species is best propagated by seeds, which must be sown on a hot-bed early in the spring; when the plants appear, they should be removed to a fresh hot-bed to quicken their growth; and when large enough, must be transplanted into separate pots filled with light fresh earth, which should be plunged into a tan-bed. About the end of June some of the plants may be inured to the open air, and afterwards turned out of their pots and planted in warm borders.

All the other species are perennials, and easily propagated by cuttings; but require care and moderate warmth.

MESENTERIC. Meseraic. Belonging to the mesentery. See MESENTERY.

MESENTERIC ARTERIES. Two branches of the aorta in the abdomen are so called. The superior mesenteric is the second branch; it is distributed upon the mesentery, and gives off the superior or right colic artery. The inferior mesenteric is the fifth branch of the aorta; it sends off the internal hæmorrhoidal.

MESENTERIC GLANDS. These are conglobate, and are situated here and there in the cellular membrane of the mesentery. The chyle from the intestines passes through these glands to the thoracic duct.

MESENTERIC PLEXUS OF NERVES. The superior, middle, and lower mesenteric plexuses of nerves are formed by the branches of the great intercostal nerves.

MESENTERIC VEINS. They all run into one trunk, that evacuates its blood into the vena portæ. See VENA PORTÆ.

MESENTERITIS. (*mesenteritis*, μεσεντεριτις, from μεσεντεριον, the mesentery.) An inflammation of the mesentery. A species of peritonitis of Cullen.

MESENTERY. (*mesenterium*, μεσεντεριον; from μεσος, the middle, and εντερον, an intestine.) The membranaceous viscus in the cavity of the abdomen, attached to the vertebræ of the loins, and to which the intestines adhere. It is formed of a duplicature of the peritonæum, and contains within it, adipose membrane, lacteals, lymphatics, lacteal glands, mesenteric arteries, veins, and nerves. Its use is to sustain the intestines in such a manner that they possess both mobility and firmness; to support and conduct with safety the blood-vessels, lacteals, and nerves; to fix the glands, and give an external coat to the intestines.

MESERAIC. See MESARAIC.

MESH. *s.* (*maesche*, Dutch.) The interstice of a net; the space between the threads of a net (*Blackmore*).

To MESH. *v. a.* (from the noun) To catch in a net; to ensnare (*Drayton*).

MESHY. *a* (from *mesh.*) Reticulated; of network (*Carew*).

MESLIN. (from *miscellane.*) Mixed corn: as, wheat and rye (*Hooker*).

MESN, or MESNE, a term in law, signifying him who is lord of a manor, and so hath tenants holding of him; yet he himself holds of a superior lord. The word is properly derived from *maisne*, *quasi minor natu*; because his tenure is derived from another, from whom he holds.

MESN also denotes a writ, which lieth where there is lord mesn and tenant; and the tenant is distrained for services due from the mesn to the superior lord.

MESOCOLON. (*mesocolon*, μεσοκωλον; from μεσος, the middle, and κωλον, the colon.) In anatomy, the portion of the mesentery to which the colon is attached. The mesentery and mesocolon are the most important of all the productions of the peritonæum. In the pelvis, the peritonæum spreads itself shortly before the rectum. But where that intestine becomes loose, and forms the semilunar curve, the peritonæum there rises considerably from the middle iliac vessels, and region of the psoas muscle, double, and with a figure adapted for receiving the hollow colon. But above, on the left side, the colon is connected with almost no intermediate loose production to the peritonæum, spread upon the psoas muscle, as high as the spleen, where this part of the peritonæum, which gave a coat to the colon, being extended under the spleen, receives and sustains that viscus in a hollow superior recess.

Afterwards the peritonæum, from the left kidney, from the interval between the kidneys, from the large vessels, and from the right kidney, emerges forwards under the pancreas, and forms the broad and sufficiently long continuous production, called the transverse mesocolon, which like a partition divides the upper part of the abdomen, containing the stomach, liver, spleen, and pancreas, from the lower part. The lower plate of this transverse production is continued singly from the right mesocolon to the left, and serves as an external coat to a pretty large portion of the liver, and descending part of the duodenum. But the upper plate, less simple in the course, departs from the lumbar peritonæum at the kidney, and region of the vena cava, farther to the right than the duodenum, to which it gives an external membrane, not quite to the valve of the pylorus; and beyond this intestine, and beyond the colon, it is joined with the lower plate, so that a large part of the duodenum lies within

the cavity of the mesocolon. Afterwards, in the region of the liver, the mesocolon is inflected, and descending over the kidney of the same side, much shorter, it includes the right of the colon, as far as the intestinum cæcum, which rests upon the iliac muscle and the appendix, which is provided with a peculiar long curved mesentery. There the mesocolon terminates, almost at the bifurcation of the aorta.

The whole of the mesocolon and of the mesentery is hollow, so that the air may be forced in between its two laminæ, in such a manner as to expand them into a bag. At the place where it sustains the colon, and also from part of the intestinum rectum, the mesocolon, continuous with the outer membrane of the intestine, forms itself into small slender bags resembling the omentum, for the most part in pairs, with their loose extremities thicker and bifid, and capable of admitting air blown in between the plates of the mesocolon.

MESOIDES. (Greek.) The name by which the ancients distinguished a kind of melopœia, the sounds of which were chiefly confined to the middle chords: which chords were also called the mesoides of the mesis, or tetrachord meson.

MESOLOGARITHMS, according to Kepler, are the logarithms of the co-sines and co-tangents; the former of which were called by baron Napier anti-logarithms, and the latter differentials.

MESON. The genitive plural of *mesis*, the middle. A term applied by the ancient Greeks to the second of their tetrachords (reckoning from the gravest) because it is placed between the first and third tetrachords, i. e. the hypaton and synemmenon.

MESOPOTAMIA, the ancient name of the province of Diarbeck, in Turkey in Asia. It is situated between the rivers Euphrates and Tigris; having Assyria on the east, Armenia on the north, Syria on the west, and Arabia Deserta with Babylonia on the south. The Hebrews called it Padan-aram (Gen. xxviii. 2, &c.) and Aram Nabaraim (title of Psal. lx.) or Aram of the two rivers, because it was first peopled by Aram father of the Syrians, and is situated between the two rivers already mentioned. This country is much celebrated in scripture, as being the first dwelling of men both before and after the deluge; and because it gave birth to Phaleg, Heber, Terah, Abraham, Nahor, Sarah, Rebekah, Rachel, Leah, and to the sons of Jacob. Babylon was in the ancient Mesopotamia, till, by vast labour and industry, the two rivers of the Tigris and Euphrates were united into one channel. The plains of Shinar were in the same country. Often they gave it the name of Mesopotamia (Deut. xxiii. 4, &c.) and sometimes that of Syria, (Hosea xii. 12.) Balaam son of Beor was of Mesopotamia, Deut. xxiii. 4. Chushan-rishathaim king of Mesopotamia kept the Hebrews in subjection some time after the death of Joshua, Judg. iii. 8.

MESOPTERYGIUS, in ichthyology, a term applied to such fishes as have only one back-fin, and that situated in the middle of the back.

MESORECTUM. (*mesorectum*, from μεσος, the middle, and *rectum*, the straight gut). The portion of peritonæum which connects the rectum to the pelvis.

MESPILUS. Medlar. In botany, a genus of the class icosandria, order pentagynia. Calyx five-cleft; petals five; styles from two to five; drupe inferior, with from two to five dispermous nuts. Twenty-two species, including those of the genus Cratægus of Linnéus; which ought not to be separated from it: chiefly North American plants: a few European and Asiatic. The chief are,

1. M. germanica. Common medlar. Unarmed; leaves lanceolate, somewhat downy; flowers solitary, sessile, terminal, with five styles. Found wild in our own hedges, bearing a brown fruit, of the size of small apples, which ripen in October, but are not eatable till they begin to decay.

2. M. chamæ-mespilus. Unarmed; leaves oval, acutely serrate, glabrous; flowers in corymbed heads; styles five: teeth of the calyx shorter than the tube. This plant bears a red fruit, which is called downy medley or bastard quince. It is a native of Austria.

3. M. cotoneaster. Dwarf quince.

MESPISE. *s.* (probably misprinted for *mesprise*; *mespris*, French.) Contempt; scorn (*Spenser*).

MESS. *s* (*mes*, old French.) A dish; a quantity of food sent to table together (*Shaks.*).

To MESS. *v. n.* To eat; to feed.

MESSA DI VOCE. An expression applied by the Italians to a swell of the voice upon a holding note.

MESSAGE. *s.* (*message*, French). An errand; any thing committed to another to be told to a third (*South. Dryden*).

MESSALA, a name of Valerius Corvinus, from his having conquered Messana in Sicily. This family was very ancient; the most celebrated was a friend of Brutus, who seized the camp of Augustus at Philippi. He was afterwards reconciled to Augustus, and died A. D. 9, in his 77th year. (*Plut.*)

MESSALINA VALERIA, a daughter of Messala Barbatus. She married the emperor Claudius, and disgraced herself by her cruelties and incontinence. Her husband's palace was not the only seat of her lasciviousness, but she prostituted herself in the public streets. Her extravagances at last irritated her husband, who commanded her to appear before him. She attempted to destroy herself, and when her courage failed, one of the tribunes who had been sent to her despatched her with his sword, A. D. 48.

MESSANA, an ancient and celebrated town of Sicily, on the streights which separate Italy from Sicily. It was anciently called Zancle, and was founded 1600 years before the Christian era. The inhabitants were called Messenii, Messanienses, and Mamertini. The streights of Messana have always been looked upon as very dangerous, especially by the an-

cients, on account of the rapidity of the currents, and the irregular and violent flowing and ebbing of the sea. Now MESSINA, which see.

MESSAPIA, a country of Italy, between Tarentum and Brundusium, the same as Calabria. It received its name from Messapus, the son of Neptune, who left a part of Bœotia called Messapia, and came to Italy, where he assisted the Rutulians against Æneas.

MESSE CONCERTATI. (Ital.) Masses in which the recitation is intermixed with chorusses.

MESSE DI CAPELLA. An expression applied by the Italians to masses sung by their grand chorus. In these compositions, various fugues, double counterpoints, and other elaborate qualifications, are always required.

MESSENE, a daughter of Triopas, king of Argos, who married Polycaon, son of Lelex, king of Laconia. She encouraged her husband to levy troops, and to seize Peloponnesus, which, after it had been conquered, received her name. She received divine honours after death. (*Paus.*).

MESSENE or MESSENA, a city in the Peloponnesus, the capital of the country called Messenia, which is situate between Laconia Elis, Arcadia, and the sea. The inhabitants have rendered themselves famous for the three wars which they carried on against the Spartans, and which received the appellation of Messenian.

ME'SSENGER. *s.* (*messager*, French.) One who carries an errand; one who brings an account or foretoken of any thing (*Clarendon*).

MESSENGERS are certain officers chiefly employed under the direction of the secretaries of state, and always in readiness to be sent with all kinds of dispatches foreign and domestic. They also, by virtue of the secretaries warrants, take up persons for high treason, or other offences against the state. The prisoners they apprehend are usually kept at their own houses, for each of which they are allowed 6s. 8d. per day by the government: and when they are sent abroad, they have a stated allowance for their journey, viz. 30*l.* for going to Paris, Edinburgh, or Dublin; 25*l.* for going to Holland; and to other places in the same proportion; part of which money is advanced for the expence of their journey. Their standing salary is 45*l.* per annum; and their posts, if purchased, are esteemed worth 300*l.* The messengers wait 20 at a time, monthly, and are distributed as follows, viz. four at court, five at one secretary's office, five at another, two at the third for North Britain, three at the council office, and one at the lord chamberlain's of the houshold.

MESSENGERS OF THE EXCHEQUER, are four officers who attend the exchequer, in the nature of pursuivants, and carry the lord treasurer's letters, precepts, &c.

MESSENGER OF THE PRESS, a person who, by order of the court, searches printing-houses, booksellers shops, &c. in order to discover the printers or publishers of seditious books, pamphlets, &c.

MESSENIA, a province of Peloponnesus. See MESSENE.

MESSERCHMIDIA, in botany, a genus of the class pentandria, order monogynia. Corol funnel-form, with the throat naked, berry corky, bipartite, each two-seeded. Three species; two shrubs of the south of Europe, one of Teneriffe.

MESSIAH, a word signifying one anointed, or installed into an office by unction. It was usual among the Jews to anoint kings, high-priests, and sometimes prophets, at the designation or instalment of them, to signify emblematically the mental qualifications necessary for discharging these offices. Saul, David, Solomon, and Joash, kings of Judah, received the royal unction. Aaron and his sons received the sacerdotal, and Elisha the disciple of Elijah received the prophetic unction.—The name Messiah, anointed, or Christ (χριστος), was given to the kings and high-priests of the Jews. The patriarchs and prophets are also called by the name of Messiahs, or the Lord's anointed. See 1 Sam. xii. 3. 5. 1 Chron. xvi. 22. Psal. cv. 15.

But this name Messiah was principally, and by way of eminence, given by the Jews to their expected great Deliverer, whose coming they still vainly wait; and is a name the Christians apply to Jesus Christ, in whom the prophecies relating to the Messiah were accomplished. The sum of these prophecies is, that there should be a glorious person named Messiah, descended from Abraham, Isaac, and Jacob, who should be born at Bethlehem, of a virgin of the family of David, then in its decline, before the Jews ceased to be a people, while the second temple was standing, and about 500 years after Ezra's time; who, though appearing in mean circumstances, should be introduced by a remarkable forerunner, whose business it should be to awaken the attention and expectation of the people. That this illustrious person called Messiah should himself be eminent for the piety, wisdom, and benevolence of his character, and the miraculous works he should perform: yet that, notwithstanding all this, he should be rejected and put to death by the Jews; but should afterwards be raised from the dead, and exalted to a glorious throne, on which he should through all generations continue to rule, at the same time making intercession for sinners. That great calamities should for the present be brought on the Jews for rejecting him: whereas the kingdom of God should by his means be erected among the Gentiles, and disperse itself even unto the ends of the earth; wherever it came destroying idolatry, and establishing true religion and righteousness. In a word, that this glorious person should be regarded by all who believed in him as a divine teacher, an atoning sacrifice, and a royal governor: by means of whom God would make a covenant with his people, very different from that made with Israel of old; in consequence of which they should be restored to, and established in, the divine favour, and fixed in a state

of perpetual happiness. See Jesus Christ, and Christianity.

Jesus Christ asserts himself the Messiah. In St. John iv. 25. the Samaritan woman says to Jesus, "I know that when Messiah comes, who is called the Christ, he will tell us all things." Jesus answered her, " I that speak to thee am he."

MESSIEURS. *s.* (French; plural of *monsieur.*) Sirs; gentlemen.

MESSINA, an ancient, large, handsome, and strong city of Sicily, and in the Val-di-Demona, with a citadel, several forts, a fine spacious harbour, and an archbishop's see. It is seated on the sea-side, 110 miles east of Palermo, 260 south by east of Rome, and 180 south-east of Naples. E. lon. 15. 50. N. lat. 38. 10. The public buildings and the monasteries were numerous and magnificent, and it contained about 60,000 inhabitants: the harbour is one of the safest in the Mediterranean, and extremely deep: the viceroy of Sicily resides here six months in the year; and it was a place of great trade in silk, oil, fruit, corn, and excellent wine, especially since it was declared a free port. This city in the beginning of the year 1783 suffered most dreadfully by the earthquakes, which shook great part of Calabria and Sicily to their foundations, overturned many rich and populous towns, and buried thousands in their ruins. See Calabria and Earthquake. An interesting account of Messina, as it stood before the above period, is given in Mr. Swinburne's Travels in Sicily.

MESSUAGE, Messuagium, in law, a dwelling-house, with some land adjoining assigned for its use. By the name of messuage may a garden, shop, mill, cottage, chamber, cellar, or the like, pass. In Scotland, messuage denotes what is called in England the manor house, viz. the principal dwelling-house within any barony.

MESOPORPHYRON, a name given by the Greeks to the Roman laticlave; because that garment, being edged on each side, where it opened before, with purple, appeared when closed with two purple stripes down the middle. The same term was also applied to the angusticlave.

ME'SSMATE. *s.* (*mess* and *mate.*) One who eats at the same table.

MESUA. In botany, a genus of the class monadelphia, order polyandria. Calyx single, four-leaved; petals four; pistil one; nut four-sided, one-seeded. One species; an Indian tree, with lanceolate entire leaves; axillary, sessile flowers.

META, in the Roman circus, was a pile of stones of a pyramidical form, intended as a boundary of the stadium, or chariot-course. When the meta was passed the seventh time, the race was concluded. The greatest art and management were required in avoiding the meta, and yet going as near it as possible. If they went too near, they were in the greatest danger of breaking the chariot to pieces; and if they took too large a circuit in the turn, they gave their rivals an opportunity of getting within them, besides losing a great deal of space.

MET. The preterit and part. of *meet.*

META'BASIS. *s.* (Greek.) In rhetorick, a figure by which the orator passes from one thing to another.

METACARPAL BONES. The five longitudinal bones that are situated between the wrist and the fingers; they are distinguished into the metacarpal bone of the thumb, fore-finger, &c.

METACARPUS. (*metacarpus*, μετακαρπος, from μετα, after, and καρπος, the wrist.) That part of the hand between the wrist and fingers.

METACHEIRI'XIS. (from μεταχειριζω, to operate by the hand.) Surgery: any manual operation or administration.

META'GRAMMATISM. *s.* (μετα and γραμμα.) A dissolution of a name truly written into its letters, as its elements, and a new connexion of it by artificial transposition, making some perfect sense applicable to the person named; anagrammatism (*Camden*).

METAL, in heraldry. There are two metals used in heraldry, by way of colours, viz. gold and silver, in blazon called *or* and *argent*. In the common painting of arms these metals are represented by white and yellow, which are the natural colours of those metals. In engraving, gold is expressed by dotting the coat, &c. all over; and silver, by leaving it quite blank.

It is a general rule in heraldry, never to place metal upon metal, nor colour upon colour; so that if the field be of one of the metals, the bearing must be of some colour; and if the field be of any colour, the bearing must be of one of the metals.

Metals, in mineralogy. Substances forming a distinct class from all other bodies, and characterized by their perfect opacity, peculiar splendour, density, and specific gravity In their purest metallic state they possess neither taste nor smell. Metals generally constitute the fourth or fifth class in the systems of different mineralogists: in that of Gmelin, which we have chiefly made use of in the present work, they occupy the fourth, and are divided into two grand sections of malleable and brittle. Under Dr. Thomson's system, they are divided into the four following sections: 1. Malleable. 2. Brittle and easily fused. 3. Brittle and difficultly fused. 4. Refractory. Metals, says this ingenious chemist (for we cannot give a more condensed account of them than his own is), may be considered as the greatest instruments of all our improvements: without them many of the arts and sciences could hardly have existed. So sensible were the ancients of their great importance, that they raised those persons who first discovered the art of working them to the rank of deities. In chemistry, they have always filled a conspicuous station: at one period the whole science was confined to them; and it may be said to have owed its very existence to a rage for making and transmuting metals.

1. One of the most conspicuous properties

of the metals is a particular brilliancy which they possess, and which has been called the metallic lustre. There are other bodies indeed (mica for instance) which apparently possess this peculiar lustre, but in them it is confined to the surface, and accordingly disappears when they are scratched, whereas it pervades every part of the metals. This lustre is occasioned by their reflecting much more light than any other bodies; a property which seems to depend partly on the closeness of their texture. This renders them peculiarly proper for mirrors, of which they always form the basis.

2. They are perfectly opaque, or impervious to light, even after they have been reduced to very thin plates. Silver leaf, for instance, 1-160000th of an inch thick, does not permit the smallest ray of light to pass through it. Gold, however, when very thin, is not absolutely opaque: for gold leaf 1-280000th of an inch thick, when held between the eye and the light, appears of a lively green; and must therefore, as Newton first remarked, transmit the green-coloured rays. It is not improbable that all other metals, as the same philosopher supposed, would also transmit light if they could be reduced to a proper degree of thinness. It is to this opacity that a part of the excellence of the metals, as mirrors, is owing; their brilliancy alone would not qualify them for that purpose.

3. They may be melted by the application of heat, and even then still retain their opacity. This property enables us to cast them in moulds, and then to give them any shape we please. In this manner many elegant iron utensils are formed. Different metals differ exceedingly from each other in fusibility. Mercury is so very fusible, that it is always fluid at the ordinary temperature of the atmosphere; while other metals, as platinum, cannot be melted except by the most violent heat which it is possible to produce.

4. Their specific gravity is much greater than that of any other body at present known. Antimony, one of the lightest of them, is more than six times heavier than water; and the specific gravity of platinum, the heaviest of all the metals, is 23. This great density, no doubt, contributes considerably to the reflection of that great quantity of light which constitutes the metallic lustre.

5. They are the best conductors of electricity of all the bodies hitherto tried.

6. None of the metals are very hard; but some of them may be hardened by art to such a degree as to exceed the hardness of almost all other bodies. Hence the numerous cutting instruments which the moderns make of steel, and which the ancients made of a combination of copper and tin.

7. The elasticity of the metals depends upon their hardness; and it may be increased by the same process by which their hardness is increased. Thus the steel of which the balance-springs of watches are made is almost perfectly elastic, though iron in its natural state possesses but little elasticity.

8. But one of their most important properties is malleability, by which is meant the capacity of being extended and flattened when struck with a hammer. This property, which is peculiar to metals, enables us to give the metallic bodies any form we think proper, and thus render it easy for us to convert them into the various instruments for which we have occasion. All metals do not possess this property; but it is remarkable that almost all those which were known to the ancients have it. Heat increases this property considerably. Metals become harder and denser by being hammered.

9. Another property, which is also wanting in many of the metals, is ductility; by which we mean the capacity of being drawn out into wire, by being forced through holes of various diameters.

10. Ductility depends, in some measure, on another property which metals possess, namely, tenacity; by which is meant the power which a metallic wire of a given diameter has of resisting, without breaking, the action of a weight suspended from its extremity. Metals differ exceedingly from each other in their tenacity. An iron wire, for instance, 1-10th of an inch in diameter, will support, without breaking, about 500lb. weight; whereas a lead wire, of the same diameter, will not support above 29lb.

11. When exposed to the action of heat and air, most of the metals lose their lustre, and are converted into earthy-like powders of different colours and properties, according to the metal and the degree of heat employed. Several of the metals even take fire when exposed to a strong heat; and after combustion the residuum is found to be the very same earthy-like substance.

12. If any of these calces, as they are called, is mixed with charcoal-powder, and exposed to a strong heat in a proper vessel, it is changed again to the metal from which it was produced. This fact is easily explained on the principles of modern chemistry; the calx is the metal combined with oxygen, or an oxyd, in modern language, and by heating it with charcoal, which has a stronger attraction for oxygen, that substance is taken from the metal, and it is brought again to the metallic state. The oxygen in this process, uniting with the charcoal, forms carbonic acid gass.

The words calx and calcination, then, are evidently improper, as they convey false ideas; philosophers therefore now employ, instead of them, the words oxyd and oxydizement, which were invented by the French chemists. A metallic oxyd signifies a metal united with oxygen; and oxydizement implies the act of that union.

13. Metals, then, are all capable of combining with oxygen; and this combination is sometimes accompanied by combustion, and sometimes not. The new compounds formed

are called metallic oxyds, and in some cases metallic acids. These were formerly distinguished from each other by their colour. One of the oxyds, for instance, was called black oxyd, another was termed red oxyd; but it is now known that the same oxyd is capable of assuming different colours according to circumstances. The mode of naming them from their colour, therefore, wants precision, and is apt to mislead; especially as there occur different examples of two distinct oxyds of the same metal having the same colour.

As it is absolutely necessary to be able to distinguish the different oxyds of the same metal from each other with perfect precision, and as the present chemical nomenclature is defective in this respect, we may, till some better method is proposed, distinguish them from each other, by prefixing to the word oxyd the first syllable of the Greek ordinal numerals. Thus the protoxyd of a metal will denote the metal combined with a minimum of oxygen, or the first oxyd which the metal is capable of forming; deutoxyd will denote the second oxyd of a metal, or the metal combined with two doses of oxygen. When a metal has combined with as much oxygen as possible, the compound formed is denoted by the term peroxyd; indicating by it, that the metal is thoroughly oxydized.

Thus we have the term oxyd to denote the combination of metals with oxygen in general; the terms protoxyd and peroxyd to denote the minimum and maximum of oxydizement; and the terms deutoxyd, tritoxyd, &c. to denote all the intermediate states which are capable of being formed.

14. Metals are capable also of combining with the simple combustibles. The compounds thus formed are denoted by the simple combustible which enters into the combination, with the termination uret added to it. Thus the combination of a metal with sulphur, phosphorus, or carbon, is called the sulphuret, phosphuret, or carburet of the metal. Hydrogen has not been proved capable of entering into similar combinations; neither have the simple incombustibles.

15. The metals are capable likewise of combining with each other, and of forming compounds, some of which are extremely useful in the manufacture of instruments and utensils. Thus pewter is a compound of lead and tin; brass, a compound of copper and zinc; bell-metal, a compound of copper and tin. These metallic compounds are called by chemists alloys, except when one of the combining metals is mercury. In that case the compound is called an amalgam Thus the compound of mercury and gold is called the amalgam of gold.

16. The metals at present known amount to 28: of these only seven were known to the ancients as metals, and no fewer than 17 have been discovered since the year 1730: their number has multiplied exceedingly within these few years; but the more recently discovered metals, with a very small number of exceptions, are so scarce as to be of comparatively small importance. Metals may be conveniently arranged under four classes: namely, 1. Malleable metals. 2. Brittle and easily fusible. 3. Brittle and difficultly fusible. 4. Refractory: under which last name are comprehended all those metallic bodies which are only known at present in a state of combination; chemists not having succeeded hitherto in reducing them to the metallic state. The metals which belong to each of these heads will be seen from the following table.

I. Malleable.

1. Gold,	8. Osmium,
2. Platina,	9. Copper,
3. Lead,	10. Iron,
4. Mercury,	11. Nickel,
5. Palladium,	12. Tin,
6. Rhodium,	13. Lead,
7. Iridium,	14. Zinc.

II. Brittle and easily fused.

1. Bismuth,	3. Tellurium,
2. Antimony,	4. Arsenic.

III. Brittle and difficultly fused

1. Cobalt,	4. Molybdenum,
2. Manganese,	5. Uranium,
3. Chromium,	6. Tungsten.

IV. Refractory.

1. Titanium,	3. Tantalium,
2. Columbrium,	4. Cerium.

Such is the change, however, which is perpetually taking place in the modern science of chemistry, if science it may yet be called, that although we have drawn up the above table from the third and latest edition of Dr. Thomson's work, we have now to observe, that from this table one at least is now to be struck out, Dr. Wollaston having fairly established it, that tantalium (or tantalum as it is often called) and columbium are the same metal; while two unquestionably are to be added to it from the brilliant discoveries of Mr. Davy, potasium and sodium, of which potash and soda may now be contemplated as the oxyds.

In reality the illimitable scope which the voltaic power in the hands of this admirable chemist has unfolded to us, altogether confounds us, and renders it impossible to determine either what principles we are to set out with or where we are to stop. For, although he has not been equally decisive in his experiments, he has given great ground for believing that ammonia itself, and indeed all the alkaline earths, are only so many metallic oxyds, to the metals of which he has also given the respective names of ammonium, barium, strontium, and magnium. While not content with speculating concerning the earths and alkalies, he has ventured into the region of the gasses, and has shewn some reason for suspecting that at least two of these, nitrogen and hydrogen, are also metallic oxyds in a state of gass, as mercury becomes when exposed to a high degree of heat. The proper earths, nay, even sulphur and phosphorus, are also suspected of being compounds of the same kind: so that if these bold and comprehensive views should

ever be substantiated, we shall be reduced to the two principles alone of oxygen and the metallic base of bodies, operated upon in various ways by electricity. We shall resume this subject under the article VOLTAISM.

Of the metals enumerated in the table above, those of the first class were formerly called metals, by way of eminence, because they are possessed either of malleability or ductility, or of both properties together: the rest were called semi-metals, because they are brittle. But this distinction is now pretty generally laid aside; and, as Bergman observes, it ought to be so altogether, as it is founded on a false hypothesis, and conveys very erroneous ideas to the mind. The first four metals were formerly called noble or perfect metals, because their oxyds are reducible by the mere application of heat; the rest were imperfect metals, because their oxyds were thought not reducible without the addition of some combustible substance; but this distinction also is now very properly exploded: for nickel and lead, which were never admitted into the number of the noble metals, are well known to be reducible by mere heat, and have hence as fair pretensions to such a classification as gold or silver.

The following synoptic table gives us a bird's eye view of most of the characteristic properties of the different metals, and their chemical relation to each other. Cerium is omitted, as its relative properties have not been sufficiently ascertained, and potasium and sodium for the same reason.

- METALS
  - oxydable by heat
    - acidifiable
      - volatile
        - Arsenic
      - fixed
        - Molybdenum
        - Tungsten
        - Chrome
        - Columbium
    - not acidifiable
      - brittle
        - infusible or granular
          - Osmium
          - Uranium
        - fusible
          - Titanium
          - Tellurium
          - Manganese
          - Cobalt
          - Antimony
          - Bismuth
      - malleable
        - Zinc
        - Lead
        - Tin
        - Iron
        - Copper
        - Mercury
  - not oxydable by heat
    - granular and brittle
      - Iridium
      - Rhodium
    - fusible and malleable
      - Palladium
      - Nickel
      - Platina
      - Silver
      - Gold

For a more particular account of the different metals, we refer the reader to the various articles under their respective names.

METALEPSIS, in rhetoric, is a figure in which two or more tropes, and those of a different kind, are contained under one word; so that several gradations, or intervening senses, come between the word that is expressed and the thing designed by it. Thus, when Sylla says of Julius Cæsar, *In one Cæsar there are many Marius's*. Suet. in Vit. c. 1. This is a metalepsis. So when Virgil, describing that part of the African coast, where Æneas arrived with his ships, says, *a dark wood hung over it*. Æn. lib. i. ver. 165.

META'LLICAL. META'LLIC. *a.* (from *metalium*, Latin.) Partaking of metal; containing metal; consisting of metal (*Wotton*).

METALLI'FEROUS. *a* (*metallum* and *fero*, Latin.) Producing metals.

META'LLINE. *a.* (from *metal.*) 1. Impregnated with metal (*Bacon*). 2. Consisting of metal (*Boyle*).

ME'TALLIST. *s.* (*metalliste*, French.) A worker in metals; one skilled in metals (*Moxon*).

METALLO'GRAPHY. *s.* (*metallum* and γράφω.) An account or description of metals.

ME'TALLURGIST. *s.* (*metallum* and ἔργον.) A worker in metals.

METALLURGY. (from *metallum*, Lat. and ἔργον, operation, Gr, whence the term, though admitted into all European languages, is unclassical and illigitimate in its formation). The art of working metallic substances from a state of pyrite and ore to a state of perfect metallization.

We find it unnecessary, however, to enter in this article into the full extent of the subject we should otherwise have done, in consequence of our having entered pretty largely into the general character of metals in the article METAL, and into the general mode of assaying and reducing ores in the different articles allotted to the respective metals, as they have thus far occured alphabetically. To the article MINE we may also more advantageously refer a detailed account of the mode of detecting, the bearing, range, and general na-

ture of mines. So that we shall at present limit ourselves to a few practical observations on the best means of opening a mine when detected, and determined upon, and of working the pyrites and ores of which it may be expected to consist.

Of opening Mines.

When it is once ascertained that a pyrite or ore of metal can be worked with advantage, the metallurgist proceeds in his operations, by extracting the metallic matter by all the mechanical methods the art possesses, which consists in digging shafts, opening adits, employing various machines to raise the water, renew the air, bring up the ore, favour the ascent and descent of the miner, prevent the earth from giving way, &c.

In general, after having bored the ground that contains ores, or having ascertained their existence by various indications (see MINE), a square perpendicular well or shaft is dug in the ground, sufficiently wide to place straight ladders in it, over which machinery is fixed for the purpose of raising and lowering vessels, and in which it is sometimes necessary to fix pumps to draw off the water which is collected. If the ore be too deep for a single shaft to lead from the grass or surface to the vein at the bottom of the first shaft, a horizontal gallery is opened, at the end of which a second shaft is sunk, and in this manner the workmen proceed till they arrive at the bottom of the mine.

When the rock to be perforated is hard and solid, and capable of supporting itself, the shaft will not require to be guarded within; but if it be soft and friable, if it threaten to fall in during the excavation, it becomes necessary to support the shaft and gallery with pieces of woodwork, covered with planks all round.

It is also of the utmost consequence to obtain a free current of fresh air. When it is practicable to open a gallery which shall lead from the bottom of the shaft to the day or open air, a current is easily established by this simple artifice. When this is not possible, a second shaft is sunk to the extremity of the gallery opposite to the first. When one of these shafts opens at a different level from the other, the circulation and renewal of the air are easy. If the secondary shafts be of equal height, the circulation will not take place spontaneously, and a lighted furnace must be employed in some convenient part of them to produce a greater rarefaction of the confined air.

It is also necessary to provide against a dangerous ascent of waters. If the water transude gradually through the earth, it may be let off into the plain or the nearest river, by means of a horizontal adit. If it be collected in a greater quantity, or if it be not possible to open such an adit, the water is extracted by pumps, which are moved either by a stream or by a pond, or by vapour of water from an adjoining steam-engine. It is sometimes extremely difficult to defend the works against enormous masses of water, which rush forth with prodigious rapidity. These cases, however, are not common; and they are provided against by a kind of moveable strong door, or barricado, which the workmen place at the moment they find by the particular sound of the rock that the waters are coming in upon them, and hence they gain time to save themselves from being overwhelmed

The destructive elastic fluids, which so frequently are disengaged in the cavities of mines, and particularly the carbonic acid gass, and different species of mixed hydrogen gasses, the former of which is known by the name of *choak-damp*, and the latter by that of *fire-damp*, are also among the most formidable enemies of miners. Galleries, fires, ventilators, inflammations, by means of torches held at a great distance in those parts of the mines which are thus mephitized, and particularly the various methods of causing fresh air to enter, are the only remedies which can be opposed to those subterranean evils.

Few metals are found in a pure state, gold, silver, and sometimes copper excepted. The others are usually found in the state of ores, and pyrites or sulphurets, which may also be regarded as a kind of ore, intermixed and blended with a variety of extensive matters, so as not to have the ductility or other qualities of metals. The first operation however, when the metallurgist has advanced thus far, is to separate the one, of whatever kind it may be, from its bed or matrix. When it is found in large masses, most of it may be dug up free from the matrix, and the substances to which it adheres may be freed by a hammer: but as the ore is often intimately mixed with the matrix, it is necessary to try other methods for its reduction: and of this we shall treat in a subsequent section.

Of Ores and Pyrites.

Pyrite is a mineral resembling the true ores of metals, in the substances of which it is composed, in its colour or lustre, in its great weight, and, lastly, in the parts of the earth in which it is found, since it almost always accompanies ores. It is, like ores composed of metallic substances, mineralized by sulphur or by arsenic, or by both these matters, and of an unmetallic earth intimately united with its other principles.

Hence, notwithstanding the conformity of pyrites with ores properly so called, metallurgists generally distinguish the former from the latter; because the proportion and connection of the materials composing the pyrites differ much from those of ores. Thus, although sometimes pyrite contains more metal than some ores, yet generally it contains less metal, and a larger quantity of mineralising substances, sulphur, and arsenic, and particularly of unmetallic earth. The connection of these matters is also much stronger in pyrites than in ores, and they are accordingly much harder; so that almost every pyrite can strike sparks from steel.

From the above property of striking sparks from steel they have been called pyrite or pyrites; which is a Greek word signifying fire-stone. Pyrites was formerly used for fire-arms, as we now use flints; hence it was called carabine-stone. It is still named by some marcasite. Perhaps no other kind of natural body has received so many names.

Pyrite differs also from ores by its forms and positions in the earth. Although pyritous metals generally precede, accompany, and follow veins of ores, they do not, properly speaking, themselves form the oblong and continued masses called veins, as ores do; but they form masses sometimes greater and sometimes smaller, but always distinct from each other. Large quantities of them are often found unaccompanied by ores. They are formed in clays, chalk, marles, marbles, plasters, alabasters, slates, spars, quartz, granites,

crystals, in a word, in all earths and stones. Many of them are also found in pit-coals and other bituminous matter.

Pyrite is also distinguishable from ores by its lustre and figure; which is almost always regular and uniform, externally or internally, or both. Some ores indeed, like those of lead, many ores of silver, and some others, have regular forms, and are in some manner crystallised; but this regularity of form is not so universal and so conspicuous in ores as in pyrites. The lustre of pyrite seems to be caused by its hardness, and the regularity of its form by the quantity of mineralising substances which it contains.

By all these marks we may easily, and without analysis, distinguish pyrites from true ores. When we see a mineral that is heavy possessed of metallic lustre, and of any regular form, the mass of which appears evidently to be entire, that is, not to have been a fragment of another mass, and which is so hard as to be capable of striking sparks from steel, we may be assured that such a mineral is a pyrite and not an ore.

The class of pyrites is very numerous, various, and extensive. They differ one from another in the nature and proportions of their component parts, in their forms, and in their colours. The forms of these minerals are exceedingly various. No solid, regular or irregular, can easily be conceived, that is not perfectly imitated by some kind of pyrites. They are spherical, oval, cylindrical, pyramidal, prismatical, cubic; they are solids with 5, 6, 7, 8, 9, 10, &c. sides. The surface of some is angular, and consists of many bases of small pyramids; while their substance is composed of these pyramids, the points of which all unite in the centre of the mass.

Pyritous minerals differ also in their component substances. Some of them are called sulphureous, martial, cupreous, arsenical, as one or other of these substances predominate. We must observe with Henckel, that in general all pyrites are martial; as ferruginous earth is the essential and fundamental part of every pyrite. This earth is united with an unmetallic earth, with sulphur or arsenic, or with both these matters, in which case the sulphur always predominates over the arsenic, as Henckel observes. He considers these as the only essential principles of pyrites; and believes that all the other matters, metallic or unmetallic, which are found in it, are only accidental: amongst which he even includes copper, although so much of it exists in some kinds of pyrites, that these are treated as ores of copper, and sometimes contain 50lb. of copper each quintal. Many other metals, even gold and silver, are sometimes combined in pyrites; but these are less frequent, and the precious metals always in very small quantities; they are therefore justly to be considered as accidental to pyrites. The different substances composing pyrites sensibly affect its colours. Henckel distinguishes them in general into three colours, white, yellowish or a pale yellow, and yellow. He informs us, that these three colours are often so blended one with another, that they cannot be easily distinguished unless when compared together.

The white pyrites contain most arsenic, and are similar to cobalt and other minerals abounding in arsenic. The Germans call them mispickle, or mispilt. Iron and arsenic form the greatest part of this pyrites. As arsenic has the property of whitening copper; some pyritous minerals almost white, like that of Chemnitz in Misnia, are found to contain 40 pounds of copper per quintal, and which are so much whitened by the arsenic that they are very like white pyrites. But these pyritous matters are very rare, and are never so white as the true white pyrites, which is only ferruginous and arsenical.

Yellowish pyrite is chiefly composed of sulphur and iron. Very little copper and arsenic are mixed with any pyrites of this colour, and most of them contain none of these two metallic substances. This is the most common kind of pyrite: it is to be found almost every where. Its forms are chiefly round, spherical, oval, flattened, cylindrical; and it is composed internally of needles or radii which unite in the centre, or in the axis of the solid.

Yellow pyrite receives its colour from the copper and sulphur which enter into its composition. Its colour, however, is inclined to a green; but is sufficiently yellow to distinguish it from the other two kinds of pyrites, particularly when they are compared together. To make this comparison well, the pyrite must be broken, and the internal surfaces must be placed near each other. The reason of this precaution is, that the colour of minerals is altered by exposure to the air.

Persons accustomed to these minerals can easily distinguish them. The chief difficulty is, to distinguish pyrite from cobalt and other minerals; which also contain some copper and much arsenic.

Hence then we see, that arsenic is the cause of whiteness in pyrite, and is contained in every pyrite of that colour; that copper is the principal cause of the yellow colour of pyrites; and that every pyrite which is evidently yellow contains copper; that sulphur and iron produce a pale-yellow colour, which is also produced by copper and arsenic: hence some difficulty may arise in distinguishing pyrites by its colours. We may also observe, that sulphur and arsenic, without any other substance, form a yellow compound, as we see from the example of orpiment or yellow arsenic. Thus, although the colours of the pyrites enable us to distinguish its different kinds, and to know their nature at first sight, particularly when we have been accustomed to observe them; yet we cannot be entirely certain concerning the true nature of these minerals, and even of all minerals in general, that is, to know precisely the kinds and proportions of their component substances, but by chemical analysis and decomposition.

Besides the above-mentioned matters which compose pyrites, it also contains a considerable quantity of unmetallic earth; that is, an earth which cannot by any process be reduced to metal. Henckel, Crame, and all those who have examined this matter, mention this earth, and prove its existence.

We ought to observe that this earth is combined with the other principles of the pyrite, and not merely interposed betwixt its parts. It must therefore be distinguished from other earthy and stony matters mixed accidentally with pyrite, and which do not make a part of it, since they may be separated by mechanical means, and without decomposing that mineral: but the earth of which we now treat is intimately united with the other constituent parts of the pyrite, is even a constituent part of pyrite, and essential to the existence of this mineral, and cannot be separated but by a total decomposition of it.

According to Henckel, this unmetallic earth abounds much in the white pyrites, since he found from the analyses which he made, that the iron,

which is the only metal existing in these pyrites, is only about one-twentieth part of the fixed substance that remains after the arsenic has been expelled by torrefaction or sublimation. A much larger quantity of iron is in the pale-yellow pyrite. The proportion of iron is generally about twelve pounds to a quintal of pyrites, and sometimes fifty or sixty pounds: this is therefore called martial pyrites. It contains about one-fourth of its weight of sulphur, and the rest is unmetallic earth. The quantity of unmetallic earth contained in the yellow or cupreous pyrites, which are also martial, since, as we have observed, iron is an essential part of every pyrite, has not yet been determined. They probably contain some of that earth, though perhaps less of it than the others.

Although pyrites are not so valuable as true ores, because in general they contain less metal, and but exceedingly little of the precious metals; and because their metallic contents are so difficult to be extracted, that, excepting cupreous pyrite, which is called pyritous copper ore, they are not worked for the sake of the contained metal; yet they are applied to other purposes, and furnish us with many useful substances; for hence we obtain all our green and blue vitriols, much sulphur, arsenic, and orpiment.

As all pyrites contain iron, and most of them contain also sulphur; as the pyrite most frequently found contains only these two substances with the unmetallic earth; and as iron and sulphur have a singular action upon each other when they are well mixed together and moistened; hence many kinds of pyrites, particularly those which contain only the principles now mentioned, sustain a singular alteration, and even a total decomposition, when exposed during a certain time to the combined action of air and water. The moisture gradually penetrates them, divides and attenuates their parts; the acid of the sulphur particularly attacks the martial earth, and also the unmetallic earth; its inflammable principle is separated from it, and is dissipated. While these alterations happen, the pyrite changes its nature. The acid of the sulphur, which is decomposed, forms, with the fixed principles of the pyrites, vitriolic, aluminous, and selenitic salts; so that a pyrite, which was once a shining, compact, very hard mineral, becomes in a certain time a greyish, saline, powdery mass, the taste of which is saline, austere, and styptic.

Lastly, if this mass be lixiviated with water, crystals of vitriol, and sometimes of alum, according to the nature of the pyrite employed, may be obtained by evaporation and crystallization.

This alteration and spontaneous decomposition of pyrite is called efflorescence and vitriolization; because the pyrites become covered with a saline powder, and because vitriol is always formed. This vitriolization is more or less quickly accomplished in pyrite according to its nature. It is a kind of fermentation excited by moisture amongst the constituent parts of these minerals; and it is so violent in those which are most disposed to it, that is, in the pale yellow pyrites, which contain chiefly sulphur and iron, that, when the quantity of these is considerable, not only a sulphureous vapour and heat may be perceived, but also the whole kindles and burns intensely. The same phenomena are observable, and the same results are formed, by mixing well together and moistening a large quantity of filings of iron and powdered sulphur; which experiment Lemeri has made, to explain the causes of subterranean fires and volcanoes.

We cannot doubt that, as the earth contains very large masses of pyrites of this kind, they must undergo the same changes when air and moisture penetrate the cavities containing them; and the best natural philosophers agree, that very probably this surprising decomposition of pyrites is the cause of subterranean fires, of volcanoes, and of mineral waters, vitriolic, aluminous, sulphureous, hot and cold.

No other pyrite is subject to this spontaneous decomposition when exposed to humid air, but that which is both martial and sulphureous; that is, the pale yellow pyrite. The arsenical pyrite, or that which contains little or no sulphur, is not changed by exposure to air. This latter kind is harder, heavier, and more compact than the former. The pyrite which is angular and regularly shaped is chiefly of this kind. Waller, in his Mineralogy, proposes to distinguish this kind of pyrite by the name of marcasite. When cut, it may be polished so well as to give a lustre almost equal to that of diamonds, but without refracting or decomposing the light; for it is perfectly opaque. It has been employed some years past in the manufacture of toys, as of buckles, necklaces, &c. and is called in commerce marcasite. See Arsenicum.

Of working Ores and Pyrites.

There are two grand objects which the mineralist and metallurgist have in view in opening mines: these are the extraction of sulphur from the mineral mass, and the reduction of the metallic matter to a state of metal; which last operation, when employed in the large way, is called smelting. We shall offer a few words upon each.

Extraction of Sulphur from Pyrites and other Minerals.—In obtaining sulphur from pyrites, this mineral ought to be exposed to a heat sufficient to sublime the sulphur, or to make it distil in vessels, which must be close, to prevent its burning.

Sulphur is extracted from pyrites at a work at Schwartzember, in Saxony, in the high country of the mines; and in Bohemia at a place called Alter-Sattel: and here the furnaces employed for this operation are oblong, like vaulted galleries; and in the vaulted roofs are made several openings. These are called furnaces for extracting sulphur.

In these furnaces are placed earthen-ware tubes, filled with pyrites broken into pieces of the size of small nuts. Each of these tubes contains about fifty pounds of pyrites. They are placed in the furnace almost horizontally, and have scarcely more than an inch of descent. The ends, which come out of the furnace five or six inches, become gradually narrower. Within each tube is fixed a piece of baked earth, in form of a star, at the place where it begins to become narrower, in order to prevent the pyrites from falling out, or choking the mouth of the tube. To each tube is fitted a receiver, covered with a leaden pipe, pierced with a small hole to give air to the sulphur. The other end of the tube is exactly closed. A moderate fire is made with wood, and in eight hours the sulphur of the pyrites is found to have passed into the receivers. The residuum of the pyrites, after the distillation, is drawn out at the large end, and fresh pyrites is put in its place. From this residuum, which is called burnings of sulphur, vitriol is extracted. The eleven tubes, into which were put, at three several distillations, in all nine quintals, or nine hundred pounds of pyrites, yield from one hundred to one hundred and fifty pounds of crude sulphur, which is so impure as to require to be purified by a second distillation.

This purification of crude sulphur is also done in

a furnace in form of a gallery, in which five iron cucurbits are arranged on each side. These cucurbits are placed in a sloping direction, and contain about eight quintals and a half of crude sulphur. To them are luted earthen tubes, so disposed as to answer the purpose of capitals. The nose of each of these tubes is inserted into an earthen pot called the fore-runner. This pot has three openings; namely, that which receives the nose of the tube; a second smaller hole, which is left open to give air; and a third in its lower part, which is stopped with a wooden peg.

When the preparations are made, a fire is lighted about seven o'clock in the evening, and is a little abated as soon as the sulphur begins to distil. At three o'clock in the morning, the wooden pegs which stop the lower holes of the fore-runners are for the first time drawn out, and the sulphur flows out of each of them into an earthen pot with two handles, placed below for its reception. In this distillation the fire must be moderately and prudently conducted; otherwise less sulphur would be obtained, and it also would be of a grey colour, and not of the fine yellow which it ought to have when pure. The ordinary loss in the purification of eight quintals of crude sulphur is, at most, one quintal. When all the sulphur has flowed out, and has cooled a little in the earthen pots, it is cast into moulds made of beech-tree, which have been previously dipt in water and set to drain. As soon as the sulphur is cooled in the moulds, they are opened, and the cylinders of sulphur are taken out and put up in casks. These are called roll-brimstone.

As sulphur is not only in pyrites, but also in most metallic minerals, it is evident that it might be obtained by works in the great from the different ores which contain much of it, and from which it must be separated previously to their fusion: but as sulphur is of little value, the trouble of collecting it from ores is seldom taken. Smelters are generally satisfied with freeing their ores from it, by exposing them to a fire sufficient to expel it. This operation is called torrefaction, or roasting of ores. There are, however, ores which contain so much sulphur, that part of it is actually collected in the ordinary operation of roasting, without much trouble for that purpose. Such is the ore of Ramelsberg in the country of Hartz: which is an ore of lead, containing silver, is partly very pure, and partly mixed with cupreous pyrites and silver; hence it is necessary to roast it.

The roasting is performed by laying alternate strata of ore and wood upon each other in an open field, taking care to diminish the size of the strata as they rise higher; so that the whole mass shall be a quadrangular pyramid truncated above, whose base is about 31 feet square. Below, some passages are left open, to give free entrance to the air; and the sides and top of the pyramid are covered over with small ore, to concentrate the heat, and make it last longer. In the centre of this pyramid there is a channel which descends vertically from the top to the base. When all is properly arranged, ladlefulls of red-hot scoria from the smelting furnace are thrown down the channel, by which means the shrubs and wood placed below for that purpose are kindled, and the fire is from them communicated to all the wood of the pile, which continues burning till the third day. At that time the sulphur of the mineral becomes capable of burning spontaneously, and of continuing the fire after the wood is consumed. When this roasting has been continued fifteen days, the mineral becomes greasy; that is, it is covered over with a kind of varnish: twenty or twenty-five holes or hollows are then made in the upper part of the pile in which the sulphur is collected. From these cavities the sulphur is taken out thrice every day, and thrown into water. This sulphur is not pure, but crude; and is therefore sent to the manufacturers of sulphur, to be purified in the manner above related.

As this ore of Ramelsberg is very sulphureous, the first roasting, which we are now describing, lasts three months; and during this time, if much rain has not fallen, or if the operation has not failed by the pile falling down or cracking, by which the air has so much free access that the sulphur is burnt and consumed, from ten to twenty quintals of crude sulphur are by this method collected.

Metallic minerals are not the only substances from which sulphur is extracted. This matter is diffused in the earth in such quantities that the metals cannot absorb it all. Some sulphur is found quite pure, and in different forms, principally in the neighbourhood of volcanoes, in caverns, and in mineral waters. Such are the opaque kind, called virgin-sulphur; the transparent kind, called sulphur of Quito; and the native flowers of sulphur, as those of the waters of Aix-la-Chapelle. It is also found mixed with different earths. Here we may observe, that all those kinds of sulphur which are not mineralised by metallic substances are found near volcanoes, or hot mineral waters, and consequently in places where nature seems to have formed great subterranean laboratories, in which sulphureous minerals may be analysed and decomposed, and the sulphur separated, in the manner in which it is done in small in our works and laboratories. However that be, certainly one of the best and most famous sulphur-mines in the world is that called Solfatara. The Abbe Nollet has published, in the Memoirs of the Academy, some interesting observations upon this subject, which we shall here abridge.

Near Puzzoli, in Italy, is that great and famous mine of sulphur and alum, called at present Solfatara. It is a small oval plain, the greatest diameter of which is about four hundred yards, raised about three hundred yards above the level of the sea. It is surrounded by high hills and great rocks, which fall to pieces, and whose fragments form very steep banks. Almost all the ground is bare and white, like marle; and is every where sensibly warmer than the atmosphere in the greatest heat of summer, so that the feet of persons walking there are burnt through their shoes. It is impossible not to observe the sulphur there; for every-where may be perceived by the smell a sulphureous vapour, which rises to a considerable height, and gives reason to believe that there is a subterraneous fire below, from which that vapour proceeds.

Near the middle of this field there is a kind of bason three or four feet lower than the rest of the plain, in which a sound may be perceived when a person walks on it, as if there were under his feet some great cavity, the roof of which was very thin. After that, the lake Agnano is perceived, whose waters seem to boil. These waters are indeed hot, but not so hot as boiling water. This kind of ebullition proceeds from vapours which rise from the bottom of the lake, which being set in motion by the action of subterranean fires, have force enough to raise all that mass of water. Near this lake there are pits, not very deep, from which

sulphureous vapours are exhaled. Persons who have the itch come to these pits, and receive the vapours in order to be cured. Finally, there are some deeper excavations, whence a soft stone is procured which yields sulphur. From these cavities vapours exhale, and issue out with noise, and which are nothing else than sulphur subliming through the crevices. This sulphur adheres to the sides of the rocks, where it forms enormous masses: in calm weather the vapours may be evidently seen to rise twenty-five or thirty feet from the surface of the earth.

These vapours, attaching themselves to the sides of the rocks, form enormous groups of sulphur, which sometimes fall down by their own weight, and render these places of dangerous access. In entering the Solfatara, there are warehouses and buildings erected for the refining of sulphur. Under a great shed, or hangar, supported by a wall behind, and open on the other three sides, the sulphur is procured by distillation from the soft stones we mentioned above. These stones are dug from under the ground; and those which lie on the surface of the earth are neglected. These last are, however, covered with a sulphur ready formed, and of a yellow colour: but the workmen say they have lost their strength, and that the sulphur obtained from them is not of so good a quality as the sulphur obtained from the stones which are dug out of the ground.

These last are broken into lumps, and put into pots of earthen ware, containing each about twenty pints, Paris measure. The mouths of these pots are as wide as their bottoms; but their bellies, or middle parts, are wider. They are covered with a lid of the same earth, well luted, and are arranged in two parallel lines along two brick walls, which form the two sides of a furnace. The pots are placed within these walls; so that the centre of each pot is in the centre of the thickness of the wall, and that one end of the pots overhangs the wall within, while the other end overhangs the wall without. In each furnace ten of these pots are placed: that is, five in each of the two walls which form the two sides of the furnace. Betwixt these walls there is a space of fifteen or eighteen inches; which space is covered by a vault resting on the two walls. The whole forms a furnace seven feet long, two feet and a half high, open at one end, and shut at the other, excepting a small chimney through which the smoke passes.

Each of these pots has a mouth in its upper part without the furnace, in order to admit a tube of eighteen lines in diameter, and a foot in length, which communicates with another pot of the same size placed without the building, and pierced with a round hole in its base of fifteen or eighteen lines diameter. Lastly, to each of these last-mentioned pots there is a wooden tub placed below, in a bench made for that purpose. Four or five of these furnaces are built under one hangar or shed. Fires are kindled in each of them at the same time; and they are thrown down after each distillation, either that the pots may be renewed, or that the residuums may be more easily taken out. The fire being kindled in the furnace, heats the first pots containing the sulphureous stones. The sulphur rises in fumes into the upper part of the pot, whence it passes through the pipe of communication into the external vessel. There the vapours are condensed, become liquid, and flow through the hole below into the tub, from which the sulphur is easily turned out, because the form of the vessel is that of a truncated cone, whose narrower end is placed below, and because the hoops of the tub are so fastened that they may be occasionally loosened. The mass of sulphur is then carried to the buildings mentioned before, where it is remelted for its purification, and cast into rolls, such as we receive it.

Smelting of ores in general.—As ores consist of metallic matters combined with sulphur and arsenic, and are besides intermixed with earthy and stony substances of all kinds, the intention of all the operations upon these compound bodies is to separate these different substances from each other. This is effected by several operations founded on the known properties of those substances. We now proceed to give a general idea of these several operations.

First of all, the ore is to be separated from the earths and stones accidentally adherent to it; and when these foreign substances are in large masses, and are not very intimately mixed in small particles with the ore, this separation may be accomplished by mechanical means. This ought always to be the first operation, unless the adherent substance be capable of serving as a flux to the ore. If the unmetallic earths be intimately mixed with the ore, this must necessarily be broken and divided into small particles. This operation is performed by a machine which moves pestles called bocords or stampers. After this operation, when the parts of the mineral are specifically heavier than those of the unmetallic earth or stone, these latter may be separated from the ore by washing in canals through which water flows. With regard to this washing of ores it is necessary to observe, that it cannot succeed but when the ore is sensibly heavier than the foreign matters. But the contrary happens frequently, as well because quartz and spar are naturally very ponderous, as because the metallic matter is proportionally so much lighter as it is combined with more sulphur.

When an ore happens to be of this kind it is necessary to begin by roasting it, in order to deprive it of the greatest part of its sulphur.

It happens frequently that the pyritous matters accompanying the ore are so hard that they can scarcely be pounded. In this case it is necessary to roast it entirely, or partly, and to throw it red-hot into cold water; by which the stones are split, and rendered much more capable of being pulverised. Thus it happens very frequently that roasting is the first operation to which an ore is exposed.

When the substance of the ore is very fusible, this first operation may be dispensed with, and the matter may be immediately fused without any previous roasting, or at least with a very slight one. For, to effect this fusion, it is necessary that it retain a great quantity of its sulphur, which, with the other fluxes added, serves to destroy or convert into scoria a considerable part of the stony matter of the mineral, and to reduce the rest into a brittle substance, which is called the matt of lead or of copper, or other metal contained in the ore. This matt is therefore an intermediate matter betwixt the mineral and the metal; for the metal is there concentrated, and mixed with less useless matter than it was in the ore. But as this matt is always sulphureous, the metal which it contains cannot have its metallic properties. Therefore it must be roasted several times to evaporate the sulphur, before it is remelted, when the pure metal is required. This fusion of an ore not roasted, or but slightly roasted, is called crude fusion.

We may here observe upon the subject of washing and roasting of ores, that as arsenic is heavier than sulphur, and has nearly the weight of metals, the ores in which it prevails are generally very heavy, and consequently are susceptible of being washed; which is a great advantage. But, on the other side, as arsenic is capable of volatilising, scorifying, and destroying many metals, these ores have disadvantages in the roasting and fusion, in both which considerable loss is caused by the arsenic. Some ores contain, besides arsenic, other volatile semi-metals, such as antimony and zinc. These are almost untractable, and are therefore neglected. They are called mineræ rapaces, "rapacious ores."

When the metal has been freed as much as is possible from foreign matters by these preliminary operations, it is to be completely purified by fusions more or less frequently repeated; in which proper additions are made, either to absorb the rest of the sulphur and arsenic, or to complete the vitrification or scorification of the unmetallic stones and earth.

Lastly, as ores frequently contain several different metals, these are to be separated from each other by processes suited to the properties of these metals; of which we shall speak more particularly as we proceed in our examination of the ores of each metal.

To facilitate the extraction of metallic substances from the ores and minerals containing them, some operations previous to the fusion or smelting of these ores and minerals are generally necessary. These operations consist of, 1. The separation of the ores and metallic matters from the adhering unmetallic earths and stones, by hammers and other mechanical instruments, and by washing with water. 2. Their division or reduction into smaller parts by contusion and trituration, that by another washing with water they may be more perfectly cleansed from extraneous matters, and rendered fitter for the subsequent operations, calcination or roasting, and fusion. 3. Roasting or calcination; the uses of which operation are, to expel the volatile, useless, or noxious substances, as water, vitriolic acid, sulphur, and arsenic; to render the ore more friable, and fitter for the subsequent contusion and fusion; and, lastly, to calcine and destroy the viler metals, for instance the iron of copper ores, by means of the fire, and of the sulphur and arsenic. Stones, as quartz and flints, containing metallic veins or particles, are frequently made red-hot, and then extinguished in cold water, that they may be rendered sufficiently friable and pulverable, to allow the separation of the metallic particles.

Roasting is unnecessary for native metals; for some of the richer gold and silver ores; for some lead-ores, the sulphur of which may be separated during the fusion; and for many calciform ores, as these do not generally contain any sulphur and arsenic.

In the roasting of ores the following attentions must be given: 1. To reduce the mineral previously into small lumps, that the surface may be increased; but they must not be so small, nor placed so compactly, as to prevent the passage of the air and flame. 2. The larger pieces must be placed at the bottom of the pile, where the greatest heat is. 3. The heat must be gradually applied, that the sulphur may not be melted, which would greatly retard its expulsion; and that the spars, fluors, and stones intermixed with the ore, may not crack, fly, and be dispersed. 4. The ores not thoroughly roasted by one operation must be exposed to a second. 5. The fire may be increased towards the end, that the noxious matters more strongly adhering may be expelled. 6. Fuel which yields much flame, as wood and fossil coals free from sulphur, is said to be preferable to charcoal or coaks. Sometimes cold water is thrown on the calcined ore at the end of the operation, while the ore is yet hot, to render it more friable.

No general rule can be given concerning the duration or degree of the fire, these being very various, according to the difference of the ores. A roasting during a few hours or days is sufficient for many ores; while some, such as the ore of Ramelsberg, require that it should be continued during several months.

Schlutter enumerates five methods of roasting ores. 1. By constructing a pile of ores and fuel placed in alternate strata, in the open air, without any furnace. 2. By confining such a pile within walls, but without a roof. 3. By placing the pile under a roof, without lateral walls. 4. By placing the pile in a furnace consisting of walls and a roof. 5. By roasting the ore in a reverberatory furnace, in which it must be continually stirred with an iron rod.

Several kinds of fusions of ores may be distinguished. 1. When a sulphureous ore is mixed with much earthy matter, from which it cannot be easily separated by mechanical operations, it is frequently melted, in order to disengage it from these earthy matters, and to concentrate its metallic contents. By this fusion some of the sulphur is dissipated, and the ore is reduced to a state intermediate betwixt that of ore and of metal. It is then called a matt (*lapis sulphureo metallicus*); and is to be afterwards treated like a pure ore by the second kind of fusion, which is properly the smelting, or extraction of the metal by fusion. 2. By this fusion or smelting, the metal is extracted from the ore previously prepared by the above operations, if these be necessary. The ores of some very fusible metals, as of bismuth, may be smelted by applying a heat sufficient only to melt the metals, which are thereby separated from the adhering extraneous matters. This separation of metals by fusion, without the vitrification of extraneous matters, may be called eliquation. Generally, a complete fusion of the ore and vitrification of the earthy matters are necessary for the perfect separation of the contained metals. By this method metals are obtained from their ores, sometimes pure, and sometimes mixed with other metallic substances, from which they must be afterwards separated, as we shall see when we treat of the extraction of particular metals. To procure this separation of metals from ores, these must be so thinly liquefied, that the small metallic particles may disengage themselves from the scoria; but it must not be so thin as to allow the metal to precipitate before it be perfectly disengaged from any adhering extraneous matter, or to pervade and destroy the containing vessels and furnace. Some ores are sufficiently fusible; but others require certain additions called fluxes, to promote their fusion and the vitrification of their unmetallic parts; and also to render the scoria sufficiently thin to allow the separation of the metallic particles.

Different fluxes are suitable to different ores, according to the quality of the ore, and of the matrix, or stone adherent to it.

The matrices of two different ores of the same metal frequently serve as fluxes to each other;

as; for instance, an argillaceous matrix with one that is calcareous; these two earths being disposed to vitrification when mixed, though each of them is singly unfusible. For this reason, two or more different ores to be smelted are frequently mixed together.

The ores also of different metals require different fluxes. Thus calcareous earth is found to be best suited to iron ores, and sand, fusible stones, fusible ores of copper.

The fluxes most frequently employed in the smelting of ores are, calcareous earths, fluors or vitreous spars, quartz, and sand, fusible stones, as slates, basaltes, the several kinds of scoria, and pyrites.

Calcareous earth is used to facilitate the fusion of ores of iron, and of some of the poorer ores of copper, and, in general, of ores mixed with argillaceous earths, or with feltspar. This earth has been sometimes added with a view of separating the sulphur, to which it very readily unites: but by this union the sulphur is detained, and a hepar is formed, which readily dissolves iron and other metals, and so firmly adheres to them, that they cannot be separated without more difficulty than they could from the original ore. This addition is therefore not to be made till the sulphur be previously well expelled.

Fluors or fusible spars facilitate the fusion of most metallic minerals, and also of calcareous and argillaceous earths, of steatites, asbestus, and some other unfusible stones, but not of siliceous earths without a mixture of calcareous earth.

Quartz is sometimes added in the fusion of ferruginous copper ores, the use of which is said chiefly to be, to enable the ore to receive a greater heat, and to give a more perfect vitrification to the ferruginous scoria.

The fusible stones, as slates, basaltes, are so tenacious and thick when fused that they cannot be considered properly as fluxes, but as matters added to lessen the too great liquidity of some very fusible minerals.

The scoria obtained in the fusion of an ore is frequently useful to facilitate the fusion of an ore of the same metal, and sometimes even ores of other metals.

Sulphurated pyrites greatly promote the fusibility of the scoria of metals from the sulphur it contains. It is chiefly added to difficultly-fusible copper ores, to form the sulphureous compounds called matts, that the ores thus brought into fusion may be separated from the adhering earthy matters, and that the ferruginous matter contained in them may be destroyed, during the subsequent calcination and fusion, by means of the sulphur.

As in the ores called calciform the metallic matter exists in a calcined state; and as calcination reduces the metals of mineralised ores (excepting the perfect metals) to that state also: therefore all calciform and calcined ores require the addition of some inflammable substance to reduce them to a metallic state. In great works, the charcoal or other fuel used to maintain the fire produces also this effect.

Metals are sometimes added in the fusion of ores of other more valuable metals, to absorb from these sulphur or arsenic. Thus iron is added to sulphurated, cupreous, and silver ores.

Metals are also added in the fusion of ores of other more valuable metals, to unite with, and collect the small particles of these dispersed through much earthy matter, and thus to assist their precipitation. With these intentions lead is frequently added to ores and minerals containing gold, silver, or copper.

Ores of metals are also sometimes added to assist the precipitation of more valuable metals. Thus antimony is frequently added to assist the precipitation of gold intermixed with other metallic matters.

Generally speaking, some separate and different process is necessary for the reduction of the different metals: we have here given the common processes alone; and as the peculiar methods may be more conveniently detailed under the heads of the respective metals as they occur, we have noticed them in those articles accordingly.

METAMORPHOPSIA. (*metamorphopsia*, μεταμορφοψια; from μεταμορφωσις, a change, and οψις sight.) Visus defiguratus. Disfigured vision. It is a defect in vision, by which persons perceive objects changed in their figures. The species are; 1. Metamorphopsia acuta, when objects appear much larger than their size. 2. Metamorphopsia diminuta, when objects appear diminished in size, arising from the same causes as the former. 3. Metamorphopsia mutans, objects seem to be in motion; to the vertiginous and intoxicated persons every thing seems to stagger. 4. Metamorphopsia tortuosa seu flexuosa, when objects appear tortuous or bending. 5. Metamorphopsia inversa, when objects appear inverted. 6. Metamorphopsia imaginaria, is the vision of a thing not present, as may be observed in the delirious and in maniacs. 7. Metamorphopsia from a remaining impression: it happens to those who very attentively examine objects, particularly in a great light, some time after to perceive the impression.

To METAMORPHOSE. *v. a.* (μεταμορφόω.) To change the form or shape of any thing (*Wotton*).

METAMORPHOSIS. (μεταμορφωσις, formed of μετα, change, or removal from one place or state to another, and μορφη, form, or figure, transformation.) The change of a person or thing into another form.

The ancients held two kinds of metamorphoses; the one real, the other apparent. The metamorphosis of Jupiter into a bull, and of Minerva into an old woman, were only apparent. That of Lycaon into a wolf, and of Arachne into a spider, and the like, they say, were of the real kind.

Most of the ancient metamorphoses include some allegorical meaning, relating either to physics or morality. Ovid's Metamorphoses is a collection of histories of such transformations, poetically related. Some authors are of opinion, that a great part of the ancient philosophy is couched under them; and Dr. Hook has made an attempt to unriddle and lay open the hidden meanings of several of them.

METAPHOR. Metapho'ra. (μεταφορα, translation, or displacing; of μετα, trans, and φερω, I bear, or carry.) In rhetoric, a figure of speech, or a species of trope, whereby a word is transferred from its proper signification to another, different from it, by reason of some similitude between them; or whereby the pro-

per denomination of one thing is applied to another; which other thing is more elegantly explained by this tralatitious or foreign name, than by that which naturally belongs to it. As, when we say, the light of the understanding; to burn with zeal; to float between hope and despair, &c.

The metaphor is the most common of all the figures of speech; and is that usually meant, when we say a thing is spoken figuratively.

The metaphor is a short simile; or, as Cicero calls it, a similitude reduced to a single word; an image being thereby called from its proper subject to give the resemblance of another. An allegory is no more than a continued metaphor.

METAPHOR and ALLEGORY, in poetry.—A metaphor differs from a simile in form only, not in substance: in a simile the two subjects are kept distinct in the expression, as well as in the thought; in a metaphor, the two subjects are kept distinct in the thought only, not in the expression. A hero resembles a lion, and upon that resemblance many similies have been raised by Homer and other poets. But instead of resembling a lion, let us take the aid of the imagination, and feign or figure the hero to be a lion: by that variation the simile is converted into a metaphor; which is carried on by describing all the qualities of a lion that resemble those of the hero. The fundamental pleasure here, that of resemblance, belongs to the thought. An additional pleasure arises from the expression: the poet, by figuring his hero to be a lion, goes on to describe the lion in appearance, but in reality the hero: and his description is peculiarly beautiful, by expressing the virtues and qualities of the hero in new terms, which, properly speaking, belong not to him, but to the lion. This will better be understood by examples. A family connected with a common parent resembles a tree, the trunk and branches of which are connected with a common root: but let us suppose, that a family is figured, not barely to be like a tree, but to be a tree; and then the simile will be converted into a metaphor, in the following manner:

Edward's seven sons, whereof thyself art one,
Were sev'n fair branches, springing from one
    root;
Some of these branches by the dest'nies cut:
But Thomas, my dear lord, my life, my
    Glo'ster,
One flourishing branch of his most royal root,
Is hack'd down, and his summer-leaves all
    faded,
By Envy's hand and Murder's bloody axe.
Richard II. act. i. *sc.* 3.

Figuring human life to be a voyage at sea:

There is a tide in the affairs of men,
Which, taken at the flood, leads on to fortune:
Omitted, all the voyage of their life
Is bound in shallows and in miseries.
On such a full sea are we now afloat;
And we must take the current when it serves,
Or lose our ventures.
Julius Cæsar, act iv. *sc.* 5.

An allegory differs from a metaphor; and a figure of speech differs from both. A metaphor is defined above to be an act of the imagination, figuring one thing to be another. An allegory requires no such operation, nor is one thing figured to be another; it consists in choosing a subject having properties or circumstances resembling those of the principal subject; and the former is described in such a manner as to represent the latter: the subject thus represented is kept out of view; we are left to discover it by reflection, and we are pleased with the discovery because it is our own work. See ALLEGORY.

Quintilian gives the following instance of an allegory:

O navis, referent in mare te novi
Fluctus. O quid agis? fortiter occupa portum.
Horat. lib. i. *ode* 14.

and explains it elegantly in the following words: "Totusque ille Horatii locus quo navim pro republica, fluctuum tempestates pro bellis civilibus, portum pro pace atque concordia, dicit."

In a figure of speech, there is no fiction of the imagination employed, as in a metaphor; nor a representative subject introduced, as in an allegory. This figure, as its name implies, regards the expression only, not the thought; and it may be defined, the using a word in a sense different from what is proper to it.—Thus youth, or the beginning of life, is expressed figuratively by morning of life; morning is the beginning of the day; and in that view it is employed to signify the beginning of any other series, life especially, the progress of which is reckoned by days. See FIGURE OF SPEECH.

Metaphor and allegory are so much connected that it seemed proper to consider them together: the rules particularly for distinguishing the good from the bad, are common to both.

With regard to allegory, nothing gives greater pleasure than this figure when the representative subject bears a strong analogy, in all its circumstances, to that which is represented: but the choice is seldom so lucky; the analogy being generally so faint and obscure as to puzzle, and not please. An allegory is still more difficult in painting than in poetry: the former can show no resemblance but what appears to the eye; the latter hath many other resources for showing the resemblance. And therefore, with respect to what the Abbé du Bos terms mixt allegorical compositions, these may do in poetry; because, in writing, the allegory can easily be distinguished from the historical part: no person, for example, mistakes Virgil's Fame for a real being. But such a mixture in a picture is intolerable; because in a picture the objects must appear all of the same kind, wholly real or wholly emblematical. For this reason the history of Mary de Medicis, in the palace of Luxembourg, painted by Rubens, is unpleasant by a perpetual jumble of real and allegorical personages, which produce a discordance of parts, and an obscurity upon the whole: witness, in particular, the tablature re-

presenting the arrival of Mary de Medicis at Marseilles; where, together with the real personages, the Nereids and Tritons appear sounding their shells: such a mixture of fiction and reality in the same group is strangely absurd. The picture of Alexander and Roxana, described by Luçian, is gay and fanciful; but it suffers by the allegorical figures.

In an allegory, as well as in a metaphor, terms ought to be chosen that properly and literally are applicable to the representative subject: nor ought any circumstance to be added that is not proper to the representative subject, however justly it may be applicable properly or figuratively to the principal. The following allegory is therefore faulty:

> ...... ferus et Cupido,
> Semper ardentes acuens sagittas
> Cote *cruentâ.*
> *Horat. lib.* ii. *ode* 8.

For though the blood may suggest the cruelty of love, it is an improper or immaterial circumstance in the representative subject: water, not blood, is proper for a whetstone.

A metaphor, like a simile, is excluded from common conversation, and from the description of ordinary incidents. Second, in expressing any severe passion that totally occupies the mind, metaphor is unnatural.

The following example of deep despair, beside the highly figurative style, has more the air of raving than of sense:

> *Calista.* Is it the voice of thunder, or my father?
> Madness! confusion! let the storm come on,
> Let the tumultuous roar drive all upon me,
> Dash my devoted bark; ye surges, break it;
> 'Tis for my ruin that the tempest rises.
> When I am lost, sunk to the bottom low,
> Peace shall return, and all be calm again.
> *Fair Penitent, act* v.

The following metaphor is sweet and lively, but it suits not the fiery temper of Chamont, inflamed with passion; parables are not the language of wrath venting itself without restraint:

> *Chamont.* You took her up a little tender flow'r,
> Just sprouted on a bank, which the next frost
> Had nipp'd; and, with a careful loving hand,
> Transplanted her into your own fair garden,
> Where the sun always shines: there long she flourish'd,
> Grew sweet to sense, and lovely to the eye;
> Till at the last a cruel spoiler came,
> Cropp'd this fair rose, and rifled all its sweetness,
> Then cast it like a loathsome weed away.
> *Orph. act* iv.

There is an enchanting picture of deep distress in Macbeth, where Macduff is represented lamenting his wife and children inhumanly murdered by the tyrant. Stung to the heart with the news, he questions the messenger over and over; not that he doubted the fact, but that his heart revolted against so cruel a misfortune. After struggling some time with his grief, he turns from his wife and children to their savage butcher; and then gives vent to his resentment, but still with manliness and dignity:

> O, I could play the woman with mine eyes,
> And braggart with my tongue. But, gentle Heav'n!
> Cut short all intermission; front to front
> Bring thou this fiend of Scotland and myself;
> Within my sword's length set him.—If he 'scape,
> Then Heav'n forgive him too!

Metaphorical expression, indeed, may sometimes be used with grace where a regular simile would be intolerable: but there are situations so severe and dispiriting as not to admit even the slightest metaphor. It requires great delicacy of taste to determine with firmness whether the present case be of that nature: perhaps it is; yet who could wish a single word of this admirable scene altered? See GRIEF.

METAPHO'RICAL. METAPHO'RIC. *a.* (*metaphorique*, French.) Not literal; not according to the primitive meaning of the word; figurative (*Hooker*).

METAPHRA'SE. *s.* (μετάφρασις.) A mere verbal translation from one language into another (*Dryden*).

METAPHRA'ST. *s.* (μεταφραστής.) A literal translator; one who translates word for word from one language into another.

METAPHY'SICAL. METAPHY'SIC. *a.* 1. Versed in metaphysics; relating to metaphysics. 2. In Shakspeare it means supernatural or preternatural.

METAPHYSICS, METAPHYSICA, transnaturalis; a branch of science, about whose nature and idea there is some difference among authors.

The word is formed from the preposition μετα, *trans*, beyond or above; and φυσις, nature, or φυσικη, natural.

Some define metaphysics that part of science which considers spirits and immaterial beings; which others choose to distinguish by the name of pneumatics.

Others, keeping closer to the etymology of the word, explain metaphysics by trans-natural, or præter-natural, or even post-natural philosophy: because it is subsequent in contemplation to the physical, though prior to it in the real order of beings.

Others, with more propriety, conceive metaphysics to be what some others call ontology, or ontosophy, i. e. the doctrine *de ente*, or of being, *quatenus* being.

In the same view, some philosophers call this science by the name *philosophia*, or *scientia generalis*, as being the foundation, or, as it were, the stamen or root from whence all the other parts of philosophy arise, and wherein they all meet; its object being *being* in the abstract, or general, not restrained to this or that species of beings; not to spirit any more than body: so that the doctrines of metaphysics are applicable to all beings whatever.

Philosophers, again, are divided as to the notion of a science *de ente* in general. Some hold it real, precise, and solid enough to be demonstrated; but others judge it too obscure, faint, and confused, to be admitted into philosophy.

Being, abstracted from every sort or species of being, is certainly a very vague term, and does not seem to give scope enough for a science: we do not see how it can affect the mind as an object. Add, that the common metaphysics cannot demonstrate any part of its subject, but assume the whole: there are no principles or axioms whereon to demonstrate metaphysics, which contain the principles of all other sciences.

The first who wrote professedly on the subject of metaphysics is Aristotle. Indeed, he is the first who uses the word: *μεταφυσικα*, is the title of one of his books; but this some of his commentators will have to signify no more than after the books of physics. M. du Hamel, taking the preposition *μετα* in the sense of post, is even of opinion that the word was coined by Aristotle's followers; and that it was unknown to Aristotle himself.

Aristotle's metaphysics seem to have been intended for a kind of natural theology. The metaphysics of Aristotle have been lately illustrated by the ingenious Mr. Harris, in his treatise, entitled Philosophical Arrangements, 8vo. 1775. F. Malebranche and Mr. Locke have written much more clearly and consistently of metaphysics than any of the ancients. Other excellent metaphysical writers, though according to different systems, are Berkeley, Watts, Andrew Baxter, Hartley, Reid, Beattie, and Dugald Stewart. The last mentioned ingenious author's Elements of the Philosophy of the Human Mind are very valuable, as are also his Essays, recently published. To the first of these works we can cheerfully refer those who wish to advance beyond the surface of this interesting subject.

METAPLASM. *s.* (*μεταπλασμός*.) A figure in rhetoric, wherein words or letters are transposed contrary to their natural order.

METAPONTUM, a town of Lucania in Italy, founded about 1269 years B. C. by Metabus, the father of Camilla or Epeus, one of the companions of Nestor. Pythagoras retired there for some time, and perished in a sedition.

METASTASIO (Pietro), an eminent Italian poet, was born at Rome of poor parents, in 1678. He embraced the ecclesiastical state, and his poems procured him the gift of nobility from the city of Assisi. The emperor Charles VI. appointed him poet-laureat. He died at Vienna in 1782. Metastasio wrote 26 operas, eight oratorios, besides numerous other pieces. His sonnets are very beautiful.

The greatest part of Metastasio's writings will confer immortality on their author. His dialogue is natural, simple, and easy; his style is always pure and elegant, and sometimes sublime and pathetic. His subjects are noble, interesting, and excellently adapted for representation. He was perfectly acquainted with the resources of his art, and has subjected the oper to rules. He stripped it of its machinery, an of the marvellous, which was fitted to excit the gaze of astonishment, but which gave no instruction to the understanding, and made no impression on the heart. His descriptions are copied from nature; the situations of his characters never fail to raise an interest in the reader, and often excite the tear of pity. His fables are celebrated; his characters are noble and well supported; his plots are excellently conducted, and happily unravelled. "There are scenes (says Voltaire) worthy of Corneille when he does not declaim, and of Racine when he is not feeble." His operas in point of the pathetic may be compared with our finest tragedies; and may be read with great pleasure, independent of the charms of the music. We must not, however, expect to find in Metastasio that exact regularity, and that fertile simplicity, which constitutes the excellence of some of our tragic poets: but though he sometimes transgresses the unities of time and place, he always preserves the unity of interest. Notwithstanding all these advantages, however, some critics will not allow him the merit of invention, which is the first qualification of a poet.

METASTASIS. (*metastasis*, *μεταστασις*; from *μεθιστημι*, to change, to translate.) The removal of a disease from one place to another.

METATARSAL BONES. The five longitudinal bones between the tarsus and toes; they are distinguished into the metatarsal bone of the great toe, fore toe, &c.

METATARSUS. (*metatarsus*, *μετατάρσιον*; from *μετα*, after, and *ταρσος*, the tarsus.) That part of the foot between the tarsus and toes.

METATHESIS. *s.* (*μετάθεσις*.) A transposition.

To METE. *v. a.* (*metior*, Latin.) To measure; to reduce to measure (*Creech*).

METELIN. See LESBOS and MITYLENE.

METELLA NUX. See NUX VOMICA.

METELLI (Augustino), an Italian painter, born at Bologna in 1609. He excelled in painting perspective and architecture; and, in conjunction with Michael Angelo Colonna, produced several great works. They were both employed by Philip IV. of Spain. Metelli died at Madrid in 1660.

METELLUS (Q. Cæcilius), an illustrious Roman, who distinguished himself by his successes against Jugurtha the Numidian king, and from thence acquired the name of Numidicus. He had for his lieutenant in this expedition the famous Marius, who raised himself to power by defaming the character of Metellus; in consequence of which the latter was recalled. However, he so well cleared himself that he was acquitted of the charges brought against him. There were several Romans of the same name.

To METEMPSYCHO'SE. *v. a.* (from *metempsychosis*.) To translate from body to body (*Peacham*).

METEMPSYCHOSIS (formed of $\mu\epsilon\tau\alpha$, beyond, and $\epsilon\mu\psi\upsilon\chi\omega$, I animate or enliven) In the ancient philosophy, the passage or transmigration of the soul of a man, after death, into the body of some other animal. Pythagoras and his followers held, that after death men's souls passed into other bodies, of this or that kind, according to the manner of life they had led. If they had been vicious, they were imprisoned in the bodies of miserable beasts, there to do penance for several ages; at the expiration whereof they returned afresh to animate men. But, if they lived virtuously, some happier brute, or even a human creature, was to be their lot.

What led Pythagoras into this opinion was, the persuasion he had that the soul was not of a perishable nature: whence he concluded that it must remove into some other body upon its abandoning this. Lucan treats this doctrine as a kind of officious lie, contrived to mitigate the apprehension of death, by persuading men that they only changed their lodging, and only ceased to live to begin a new life.

Pythagoras is said to have borrowed the notion of a metempsychosis from the Egyptians; others say, from the ancient Brachmans. It is still retained among the Banians and other idolaters of India and China; and makes the principal foundation of their religion. So extremely are they bigoted to it, that they not only forbear eating any thing that has life, but many of them even refuse to defend themselves from wild beasts. They burn no wood, lest some little animalcule should be in it; and are so very charitable, that they will redeem from the hands of strangers any animals that they find ready to be killed. See PYTHAGOREANS.

METEMPTOSIS. (from $\mu\epsilon\tau\alpha$, *post*, and $\pi\iota\pi\tau\omega$, *cado*, I fall.) A term in chronology, expressing the solar equation, necessary to prevent the new moon from happening a day too late. By which it stands contradistinguished from proemptosis, which signifies the lunar equation, necessary to prevent the new moon from happening a day too soon.

The new moons running a little backwards, that is, coming a day too soon at the end of 312 years and a half; by the proemptosis, a day is added every 300 years, and another every 2400 years: on the other hand, by the metemptosis, a bissextile is suppressed each 134 years; that is, three times in 400 years. These alterations are never made but at the end of each century; that period being very remarkable, and rendering the practice of the calendar easy.

METEOR. *s.* ($\mu\epsilon\tau\epsilon\omega\rho\alpha$.) Any body in the air or sky that is of a flux and transitory nature. This term is by some writers made to comprehend all the visible phenomena of meteorology, but it is more generally confined to luminous bodies appearing suddenly at uncertain times, and with more or less of motion in the atmosphere. These may be reduced under three classes, viz. fireballs, falling or shooting stars, and *ignes fatui.*

Those phenomena which are classed together under the general appellation of fire-balls were divided by the ancients into several species, according to the external form or appearance which they assumed. They were also regarded by them in a much more formidable light than by us; as being the certain prognostics of great and awful events in the moral and political world. Even the philosophic Cicero himself speaks of the *ab occidente faces*, as the certain harbingers or indications of those bloody scenes which in his time convulsed and desolated the Roman commonwealth.

Under the general name of comets, Pliny enumerates a variety of these phenomena. If the fire commences at one extremity of the meteor, and burns by degrees, he terms it, from its form and appearance, a lamp or torch; if an extended mass of fire passes longitudinally through the atmosphere, he calls it a dart; and if its length and magnitude are considerable, and it maintains its station for any space of time, it is a beam; and if the clouds seem to part and emit a quantity of fire, he terms it a chasm; but this last appears to be, strictly speaking, an electrical phenomenon, indeed only a strong and vivid flash of lightning.

Several instances of these meteors are recorded by the same author. During the spectacle of gladiators exhibited by Germanicus, one of them passed rapidly by the faces of the spectators at noon-day. A meteor of that species which he calls a beam, he adds, was seen when the Lacedemonians were defeated at sea, in that memorable engagement which lost them the empire at sea. He also mentions a sanguineous kind of meteor, a flame as red as blood, which fell from heaven about the 107th Olympiad, when Philip of Macedon was concerting his wicked plan for enslaving the republics of Greece. He relates, that when he was himself on the watch during the night in the Roman camp, he was a spectator of a similar appearance—a number of resplendent lights fixed upon the palisadoes of the camp, similar, he says, to those which mariners speak of as attaching themselves to the masts and yards of a ship.

In tropical climates these meteors are more common and more stupendous than in these more temperate regions. "As I was riding in Jamaica," says Mr. Barbham, "one morning from my habitation, situated about three miles north-west from St. Jago de la Vega, I saw a ball of fire appearing to me about the bigness of a bomb, swiftly falling down with a great blaze. At first I thought it fell into the town, but when I came nearer I saw many people gathered together a little to the southward, in the savannah, to whom I rode up to enquire the cause of their meeting: they were admiring, as I found, the ground's being strangely broken up and ploughed by a ball of fire, which, as they said, fell down there. I observed there were many holes in the ground; one in the middle of the bigness of a man's head, and five or six smaller round about it of the bigness of one's fist, and so deep as not to

be fathomed by such implements as were at hand. It was observed also, that all the green herbage was burnt up near the holes; and there continued a strong smell of sulphur near the place for some time after."

Ulloa gives an account of one of a similar kind at Quito. "About nine at night," says he, "a globe of fire appeared to rise from the side of the mountain Pichinca, and so large that it spread a light over all the part of the city facing that mountain. The house where I lodged looking that way, I was surprised with an extraordinary light darting through the crevices of the window-shutters. On this appearance, and the bustle of the people in the street, I hastened to the window, and came time enough to see it in the middle of its career, which continued from west to south, till I lost sight of it, being intercepted by a mountain that lay between me and it. It was round, and its apparent diameter about a foot. I observed it to rise from the sides of Pichinca, although to judge from its course, it was behind that mountain where this congeries of inflammable matter was kindled. In the first half of its visible course it emitted a prodigious effulgence, then it began gradually to grow dim; so that upon its disappearing behind the intervening mountain its light was very faint."

Meteors of this kind are very frequently seen between the tropics; but they sometimes also visit the more temperate regions of Europe. We have the description of a very extraordinary one, given us by Montanari, that serves to shew to what great heights in our atmosphere these vapours are found to ascend. In the year 1676, a great globe of fire was seen at Bononia, in Italy, about three-quarters of an hour after sun-set. It passed westward with a most rapid course, and at the rate of not less than 160 miles in a minute, which is much swifter than the force of a cannon ball, and at last stood over the Adriatic sea. In its course it crossed over all Italy; and, by computation, it could not have been less than 38 miles above the surface of the earth. In the whole line of its course, wherever it approached, the inhabitants below could distinctly hear it, with a hissing noise, resembling that of a firework. Having passed away to sea towards Corsica, it was heard at last to go off with a most violent explosion, much louder than that of a cannon; and immediately after another noise was heard like the rattling of a great cart upon a stony pavement, which was probably nothing more than the echo of the former sound. Its magnitude when at Bononia appeared twice as long as the moon one way, and as broad the other; so that considering its height, it could not have been less than a mile long, and half a mile broad. From the height at which this was seen, and there being no volcano in that quarter of the world whence it came, it is more than probable that this terrible globe was kindled on some part of the contrary side of the globe; and thus rising above the air and passing in a course opposite to that of the earth's motion, in this manner it acquired its amazing rapidity.

Two of these meteors appeared in this country in the year 1783, of which a most particular and truly philosophical account and ingenious solution, by Dr. Blagden, are published in the Philosophical Transactions of the following year. Other meteors of this kind have appeared more recently: but they are within the recollection of most of our readers, and need not be minutely described here. See also FIRE-BALL.

METEORIC IRON, METEORIC STONE, in mineralogy. See FERRUM and ÆROLITH.

METEORIC VIGILS. In botany, when flowers open and shut according to the temperature of the air. See VIGILS.

METEOROLO'GICAL. *a.* (from *meteorology*.) Relating to the doctrine of meteors (*Howel*).

METEORO'LOGIST. *s.* (from *meteorology*.) A man skilled in meteors, or studious of them (*Howel*).

METEOROLOGY, is the science of studying the phenomena of the atmosphere, and the term by which is expressed all the observations that tend to make them a system. There are many most important meteorological phenomena, and those may be classed under five distinct heads; for instance, the alterations that occur in the weight of the atmosphere, those that take place in its temperature, the changes produced in its quantity by evaporation and rain, the excessive agitation to which it is frequently subject, and the phenomena arising from electric and other causes, that at particular times occasion or attend the precipitations and agitations alluded to.

All the above phenomena prove to demonstration that constant changes take place, the consequences of new combinations and decompositions rapidly following each other. The majority of meteorological alterations depend on these chemical changes, and were we accurately acquainted with the peculiarities of the substances which form the component parts of the atmosphere, nothing would be more easy than to explain the result of their mutual action; but as that is unfortunately not the case, we must be contented to build upon strong probabilities supported in many instances by positive experiment.

It is singular that this science should have remained for so long a period in a state of comparative neglect, when it is recollected that almost all the operations necessary for the support of human life, and almost all the comforts of corporeal feeling, depend upon the state of the atmosphere, and yet nothing was attempted to any purpose towards investigating the laws of meteorology till the seventeenth century, when the most important discoveries of the barometer and thermometer occurred, which was followed in the eighteenth by the invention of excellent hygrometers and electrometers; by these the philosopher finds himself competent to make accurate and satisfactory observations. Scientific persons, who have particularly turned their attention to this pursuit, have undertaken the laborious task of collecting and methodically arranging numbers of the observations just mentioned, and after attentively comparing and examining them, have

formed theories of the weather, of more or less probable accuracy; but the science is of such difficulty, that though those theories deserve every praise, we are compelled to acknowledge the phenomena of the weather is still very imperfectly understood. This acknowldgment, however, reflects no discredit on those ingenious men, as it is impossible that any thing like certainty should be attained, till observations that can be depended upon are procured from all parts of the globe, the atmosphere has been more accurately explored, and the chemical changes occuring in it are correctly ascertained.

To render our explanation of this subject as satisfactory as circumstances will permit, we shall proceed in the succession before pointed out: with respect to the changes in the weight of the atmosphere, it is generally known that the instrument called the barometer shews the weight of a body of air immediately above it extending to the extreme boundary of the atmosphere, and the base of which is equal to that of the mercury contained within it. As the level of the sea is the lowest point of observation, the column of air over a barometer placed at that level is the longest to be obtained; in this case the mean height of the barometer is thirty inches. According to the experiments of sir George Shuckburg in the Channel and the Mediterranean sea in the temperature of 55° and 60°, this was found to be the case, and the result is confirmed by those of M. Bouguer on the coast of Peru in the temperature of 84°, and lord Mulgrave in latitude 80°. From these data, it is evident that the mean height of the barometer decreases in proportion with its elevation above the level of the sea, and in proportion to the consequent shortening of the columns of air; hence it is used for measuring heights. The keeping of a barometer in one particular place does not make the mercury stationary, as it will vary by rising or falling to the extent of several inches, of necessity the weight of the air which balances the mercury must be subject to the same changes; this circumstance proves that the gravity of the air in any given situation varies greatly, being at one time light and another heavy, an effect which must be caused by changes in its quantity, and a fact that demonstrates the air of every place liable to perpetual alterations, which must arise from the accumulation of air in particular places, and a reduction in others, " or " as Dr. Thomson observes, " part of the atmosphere must be alternately abstracted altogether, and restored again by some constant, though apparently irregular process."

The variations of the barometer between the tropics are very trifling, and it is worthy of observation, it does not descend more than half as much in that part of the globe for every two-hundred feet of elevation as it does beyond the tropics, which we learn from the Journal de Physique; besides, the barometer rises about two-thirds of a line twice during each day in the torrid zone. We are informed by M. Horsburgh that from latitude 26° north to latitude 27° south, which includes the space termed the tropical seas, the mercury attained its greatest elevation at eight in the morning, from which hour till noon it continued stationary; it then began to fall, and descended till about four o'clock, when it reached the lowest point of depression. In the interval between four and five the mercury rose, and continued to rise till about nine or ten P.M. when it had once more arrived at its most elevated point, where it remained stationary til[1] near midnight, when it fell and continued to fall, till at four A.M. it had descended as low as it had been at four in the afternoon; from that period till seven or eight it continued rising, and at the latter hour it had attained the highest point of elevation. The gentleman who made these observations termed the elevations and depressions now described equal tropical motions, and asserts, that they were regularly performed while the barometers were on the sea, but they were seldom observed on a river, or when the instruments were on shore. This circumstance leads us to concur with Dr. Thomson, in supposing that the singular fact is to be ascribed to the motion of the ship, " which by regularly agitating the mercury, might make its elevations and depressions more sensible and correct than when the barometer continues stationary." The range of the barometer increases gradually as the latitude advances towards the poles, till in the end it amounts to two or three inches. The following table, composed by the writer just cited, will explain the gradual increase alluded to, which he compiled from the best authorities.

Latitude		Places	Range of the barometer			
			Greatest		Annual	
0°	0′	Peru	0	20		—
22	23	Calcutta	0	77	-	—
33	55	Cape Town	-	—	0	89
40	55	Naples	1	00	-	—
51	8	Dover	2	47	1	80
53	13	Middlewick	3	00	1	94
53	23	Liverpool	2	89	1	96
59	56	Petersburgh	3	45	2	77

The range of the barometer is considerably less in North America than in the corresponding latitudes of Europe, particularly in Virginia, where it never exceeds 1.1. The range is more considerable at the level of the sea than on mountains, and in the same degree of latitude it is in the inverse ratio of the height of the place above the level of the sea.

M. Cotte composed a table which has been published in the Journal de Physique, from which it appears extremely probable that the barometer has an invariable tendency to rise between the morning and the evening, and that this impulse is most considerable from two in the afternoon till nine at night, when the greatest elevation is accomplished; but the elevation at nine differs from that at two by four-twelfths, while that of two varies from the elevation of the morning only by one-twelfth, and that in particular climates the greatest elevation is at two o'clock. The observations of M. Cotte confirm those of Mr. Luke Howard, and from them it is concluded that the barometer is influenced by some depressing cause at new and full moon, and that some other makes it rise at the quarters. This coincidence is most considerable in fair and calm weather; the depression in the interval between the quarters and conjunctions amounts to one-tenth of an inch, and the rise from the conjunctions to the quarters is to the same amount.

The range of this instrument is found to be greater in winter than in summer; for instance, the mean at York during the months from October to March inclusive, in the year 1774, was 1.42, and in the six summer months 1.016.

The more serene and settled the weather is the higher the barometer ranges, calm weather with a tendency to rain depresses it, high winds have a similar effect on it, and the greatest elevation occurs with easterly and northerly winds, but the south produces a directly contrary effect. According to the Asiatic Researches it is always observed to be highest with north and north-west winds, and the reverse when the south-east prevails; it falls rapidly previous to violent tempests, and is greatly agitated while they continue. It has been remarked by Mr. Copland in the Transactions of the Society of Manchester, that "a high barometer is attended with a temperature above, and a low barometer with one below, the monthly mean." Various but almost altogether unsuccesful attempts have been made to explain the phenomena we have enumerated; that of Mr. Kirwan carries considerable plausibility, though it is not considered quite satisfactory. In order that his ideas on the subject may be clearly understood, we shall give what may be considered an abstract of his theory, improved by Dr. Thomson. The density of the atmosphere is evidently greatest at the poles, and least at the equator, as the centrifugal force at the latter, the distance from the centre of the earth, and the heat, all contributing to lessen the density of the air, are at their maximum, when at the pole it is exactly the reverse. In every part of the world the mean height of the barometer placed at the level of the sea will be found to be 30 inches, consequently, the weight of the atmosphere is the same in all places; its weight depending on its density and height; where the former is greatest the height must be the least, and where its density is least the height is the greatest. Arguing from these facts it will, therefore, appear that the height of the atmosphere must be least at the poles, and greatest at the equator, decreasing gradually in the interval, and thus forming the resemblance of two inclined planes, meeting at the highest part above the equator.

The difference of the mean heat between the pole and the equator, when the sun is in our hemisphere in the summer, does not vary so much as in the winter, as the heat at that period in northern countries equals that of the torrid zone; hence the thermometer rises to 85° in Russia during the months of July and August, of necessity the rarity of the atmosphere and its height increases; in consequence, the upper part in the northern hemisphere inclines less, but that of the southern, from different causes, must be much more inclined; during our winter the exact reverse takes place.

The pressure of the superincumbent column in a great measure causes the density of the atmosphere, and therefore decreases in proportion to the height as the pressure of the column constantly decreases, yet the density in the torrid zone does not decrease so rapidly as in the temperate and frigid, as the column is longer, and because there is a larger proportion of air in the upper part of it. This fact agrees with the assertion of M. Cassan, "that the barometer only sinks half as much for every two hundred feet of elevation in the torrid, as in the temperate zones." The density at the equator, though less at the surface of the earth, must equal at a certain height, and still higher exceed the density in the temperate zones, and at the poles.

It is ascertained that a current of air constantly ascends at the equator, part at least of which reaches to and remains in the highest parts of the atmosphere; the fluidity of that body prevents it from accumulating above the equator, and hence it must descend the declined plane before mentioned. The surface of the atmosphere being more inclined in the northern hemisphere during our winter than that of the southern, more of the current must flow on the northern than on the southern, from which cause the quantity of our atmosphere is greater in winter than that of the southern hemisphere; in the summer it is just the contrary; consequently the range of the barometer is less in summer than in winter, and the greatest mercurial heights occur during winter.

The heat of any given place in a great measure influences the density of its atmosphere; that density will be most considerable where it is coldest, and its column shortest. Chains of mountains, the summits of which are covered with snow great part of the year, and highlands, must be colder than places less elevated in the same latitude, and the column of air over them much shorter. The current of air above must be impeded and accumulate while on its passage over these places towards the poles, which causing an agitation, it will be communicated to, and indicated by, the barometer in a singular manner. These accumulations occur over the north-west parts of Asia and North America, and this raises the barometer, and causes less variation in it there than in Europe. It is precisely so on the Pyrenees, the Alps, and the mountains in Africa, Turkey in Europe, Tartary, and Tibet. After the accumulations have existed some time the surrounding atmosphere becomes incapable of balancing the density of the air, when it descends with violence, and occasions cold winds, which raise the barometer; it is to this that we are to attribute the rise of the barometer, almost always attending north-east winds in Europe, which is the effect of accumulations near the pole, or in the north-west parts of Asia; it is thus besides that the north-west wind from the mountains of Tibet raises the barometer at Calcutta. It may be supposed that in the polar regions large quantities of air are casually compressed; when this is the case the southern atmosphere must rush in to replace it, which occasions south-west gales and the fall of the barometer.

The mean heat of our hemisphere varying in successive years, the density of the atmosphere, and necessarily, the quantity of equatorical air passing towards the poles, cannot be otherwise than variable, hence occurs the different ranges of the barometer in successive years; at some particular periods, more considerable accumulations take place in the highest parts of Asia, and the south of Europe, than at others, which may be produced by early falls of snow, or the interruption of the sun's rays by long continued fogs; at such times the atmosphere in the polar regions becomes proportionably lighter, and this causes the prevalence of southerly winds in some winters more than in others. The heat of the torrid zone never greatly varying, the height and density of the atmosphere undergoes but few changes, thence arises the comparatively small range of the barometer within the tropics, which gradually increases towards the poles as the difference of the temperature, and the density of the atmosphere increases with the latitude. The sinking of the barometer preceding violent tempests,

and the oscillations during their continuance, prove that very great rarefactions, or even destruction of air, in some part of the atmosphere produce those phenomena; the falls too that accompany winds arise from the same cause. Unfortunately we are but little acquainted with the operations which produce rain, consequently we are unable to explain satisfactorily why the barometer falls immediately preceding it.

The most inattentive observer of the phenomena of nature must have noticed that there are considerable variations in the temperature of the air in any particular place, exclusive of the differences of seasons and climates, which eternal changes cannot be produced by heat derived from the sun, as its rays concentrated have no kind of effect on air, those however heat the surface of our globe, which is communicated to the immediate atmosphere; it is through this fact that the temperature is highest where the place is so situated as to receive with most effect the rays of the sun, and that it varies in each region with the season; it is also the cause why it decreases in proportion to the height of the air above the surface of the earth. The most perpendicular rays falling on the globe at the equator, there the heat of it is the greatest, and that heat decreases gradually to the poles, of course the temperature of the air is in exact unison; from this it appears, that the air acquires the greatest degree of warmth over the equator, whence it becomes insensibly cooler till we arrive at the poles; in the same manner, the air immediately above the equator cools gradually. Though the temperature sinks as it approaches the pole, and is highest at the equator, yet as it varies continually with the seasons, it is impossible to form an accurate idea of the progression without forming a mean temperature for a year, from that of the temperature of every degree of latitude for every day of the year, which may be accomplished by adding together the whole of the observations, and dividing by their number, when the quotient will be the mean temperature for the year. "The diminution," says Dr. Thomson, "from the pole to the equator takes place in arithmetical progression; or to speak more properly, the annual temperature of all the latitudes are arithmetical means between the mean annual temperature of the equator and the pole." Mr. Mayer has the honour of this discovery, but Mr. Kirwan rendered it more simple and plain, by founding an equation on it, by which he calculated the annual mean temperature of every degree of latitude between the equator and the pole; the following was the principle of proceeding. "Let the mean annual heat at the equator be m, and at the pole $m - n$; put Φ for any other latitude; the mean annual temperature of that latitude will be $m - n \times \sin.\ \Phi^2$. If therefore the temperature of any two latitudes be known, the value of m and n may be found. Now the temperature of north lat. 40° has been found by the best observation to be 62.1°, and that of lat. 50°, 52.9°. The square of the sine of 40° is nearly 0.49, and the square of the sine of 50° is nearly 0.586. Therefore,

$$m - 0.41\, n = 62.1, \text{ and}$$
$$m - 0.58\, n = 52.9, \text{ therefore},$$

$62.1 + 0.41\, n = 52.9 + 0.58\, n$ as each of them from the two equations is equal to m. From this last equation the value of n is found to be 53 nearly; and m is nearly equal to 84. The mean temperature of the equator, therefore, is 84°, and that of the pole 31°. To find the mean temperature for every other latitude, we have only to find 88 aritnmetical means between 84 and 31."

Mr. Kirwan calculated a table of the mean annual temperature of the standard situation in every latitude, which answers only for those of the atmosphere of the ocean, as it was made for that part of the Atlantic situated between 80° north and 45° south latitude, extending westward to the gulf stream, within a few leagues of the American coast; and for all that part of the Pacific Ocean from the 45th degree of northern to the 40th of southern latitude, from the 20th to the 275th degree of longitude east of London. Mr. Kirwan terms this part of the ocean the standard, as the rest is subject to anomalies to be mentioned hereafter. The same industrious gentleman ascertained the monthly mean temperature of the standard ocean; that of April approaches very nearly to the annual mean, and as far as heat depends on the action of solar rays, that of each month is as the mean altitude of the sun, or rather as the sine of the sun's altitude. The learned investigators to whom we are indebted for these experiments and observations, say, "As the sine of the sun's mean altitude in April is to the mean heat of April, so is the sine of the sun's mean altitude in May to the mean heat of May. In the same manner the mean heats of June, July, and August, are found; but the rule would give the temperature of the succeeding months too low, because it does not take in the heat derived from the earth, which possesses a degree of heat, nearly equal to the mean annual temperature. The real temperature of these months, therefore, must be looked upon as an arithmetical mean between the astronomical and terrestrial heats. Thus in latitude 51°, the astronomical heat of the month of September is 44.6°, and the mean annual heat is 52.4°; therefore the real heat of this month should be $\dfrac{44.6 + 52.4}{2} = 48.5$.

After many laborious calculations Mr. Kirwan had the mortification to find their results differed so much from observations, that he was induced to make a table from various sea journals, and certain principles for the monthly mean temperature of the standard, from lat. 80° to lat. 10°, from which he decides that the coldest month in every latitude is January, and that July is the warmest in all above 48°, in lower August. In proportion to the distances from the equator is the increase and decrease of heat, but every latitude where existence can be maintained has a mean of 60° two months of the year at the least, which is requisite for the production of those articles by which man supports life. The temperature within ten degrees of the poles vary little, and the case is similar within the same distance from the equator; those of different years near the latter differ very little, but the differences increase as the latitudes approach the poles. It is well known that the temperature of the atmosphere diminishes gradually in proportion to its height above the level of the sea. The late Dr. Hutton of Edinburgh made some experiments on this head by placing a thermometer on the summit of Arthur's Seat, a hill so named, and another at the base of it, by which he found that the former generally stood at three degrees lower than the latter; in this instance therefore a height estimated at 800 feet produced a diminution of heat amounting to three degrees. Bouguer made a similar experiment to ascertain

the difference of temperature between the level of the sea and the top of Pinchinca, one of the Andes, when the thermometer at the summit stood at 30° and that below in the same latitude at 84°; the diminution was 54° in a supposed height of 15,564 feet. Thus far the operation is easy and practicable, but the grand difficulty lies in determining the exact gradations between the highest and lowest points of observation: conjectures on this subject have been hazarded by Euler and Saussure; the first gives it in harmonic progression; and Saussure supposed the decrease of temperature to amount to 1° for 287 feet of ascent. Mr. Kirwan, however, rejecting those improbabilities, shews in the Transactions of the Royal Irish Academy, that the rate of diminution depends upon the precise temperature of the surface of the earth where an experiment is made; he has besides invented an ingenious mode of ascertaining the rate in every instance, admitting the temperature at the surface to be known.

This gradual approach to cold demonstrates that at a certain height eternal congelation must prevail; that height varies of course according to the latitude of the place, being highest at the equator, and gradually descending on approaching the poles; it is also lower in the winter. The cold on the summit of Pinchinca was found, by M. Bouguer, to extend from seven to nine degrees every morning previous to the rising of the sun below the freezing point, from which he conjectured, that the mean height of the term of congelation (or that region where water congeals on some part of every day in the year) between the tropics, is 15.577 feet above the level of the sea; in latitude 28°, he supposes it to be 13,440 during summer; taking "the difference between the freezing point and the equator, it plainly appears, that it bears the same proportion to the term of congelation at the equator that the difference between the mean temperature of any other degree of latitude, and the freezing point, bears to the term of congelation in that latitude." "Thus," continues Dr. Thomson, "the mean heat of the equator being 84°, the difference between it and 32 is 52; the mean heat of latitude 28° is 72.3°, the difference between which and 32 is 40.3. Then 52 : 15,577 : : 40.3 : 12072." Mr. Kirwan calculated another table on this subject, from latitude 0, where he makes the mean height of the term of congelation 15,577, by gradations of five degrees up to latitude 80—120 feet; higher than this, called the lower term of congelation, which varies with circumstances and seasons, M. Bouguer places another, called by him the upper term, and beyond this no visible vapour ascends. The former gentleman supposes this line far less liable to variation in the summer than the lower term, and therefore adopted it to ascertain the rate of diminution of heat on ascending into the atmosphere. Bouguer determined the height of this term in one instance, but Kirwan went further, and produced a table of its height for every degree of latitude in the northern hemisphere. We shall quote Mr. Kirwan's rule for obtaining the temperature at any given height, admitting that the temperature at the surface of the earth is known. "Let the observed temperature at the surface of the earth be = m, the height given = h, and the height of congelation for the given latitude be = t; then $\frac{m-32}{\frac{t}{100}-1}$ = the diminution of temperature for every 100 feet of elevation; or it is the common difference of the terms of the progression required. Let this common difference thus found be denoted by c, then $c \times \frac{h}{100}$ gives us the whole diminution of temperature from the surface of the earth to the given height. Let this diminution be denoted by d, then $m - d$ is obviously the temperature required. An example will make this rule sufficiently obvious. In latitude 56° the heat of below being 54°, required the temperature of the air at the height of 803 feet.

Here $m = 54$, $t = 5,533$, $\frac{m-32}{\frac{t}{100}-11} = \frac{22}{54.33} = 0.404 = c$, and $c \times \frac{h}{100} = 0.404 \times 8.03 = 3.24 = d$, and $m - = 54 - 3.24 = 50.75$: here we see that the temperature of the air 803 feet above the surface of the earth is 50° 75″.

Estimating the diminution from this method, which corresponds with observation, we find that heat lessens in an arithmetical progression; and from the same premises it may be concluded, that the warmth of the air at some distance from the earth is not to be attributed to the rising of heated strata of air from the earth's surface, but to the conducting power of the air.

The upper strata of the atmosphere are frequently warmer in winter than the lower, and the preceding rule is applicable to the temperature of the air during the summer months only. According to the Philosophical Transactions for 1777, a thermometer placed on the summit of Arthur's Seat, the thirty-first of January, the year before, stood six degrees higher than a second at Hawkhill, situated 684 feet below it: this superior heat is considered by Mr. Kirwan to be produced by a current of heated air flowing from the equator towards the north pole during our winter. A general idea has now been given of the method by which the mean annual temperature may be found throughout the known regions of the globe; but there are some exceptions to the universality of the rules: for instance, the Pacific Ocean, between latitude 52° and 66° north, and at the northern extremity, is only 42 miles in breadth, and at its southern is 1300 miles; it is therefore but reasonable to suppose, that the temperature must be greatly affected by the land surrounding it, which rises into chains of mountains, with summits bearing snow great part of the year, exclusive of the islands consisting of high lands scattered within it. Mr. Kirwan concludes, in consequence, that its temperature is four or five degrees below the standard; this supposition cannot, however, be brought to any degree of certainty, from a deficiency of observations. It has been a generally received opinion that the southern hemisphere, beyond the fortieth degree of latitude, is much colder than corresponding parts of the northern: this our philosopher has proved to be true with respect to the summer of the former; but that the winter in the same latitude is milder than in the latter. See CLIMATE.

Inconsiderable seas, in temperate and cold climates, are colder in winter and warmer in summer than the standard ocean, as they are necessarily under the influence of natural operations from the land, and its temperature, particularly the Gulph of Bothnia, which is generally frozen in the winter, but the water is sometimes heated in

the summer to 70°, a state the opposite part of the Atlantic never acquires; the German Sea is five degrees warmer in summer than the Atlantic, and more than three colder in winter; the Mediterranean is almost throughout warmer both in winter and summer, which therefore causes the Atlantic to flow into it; and the Black Sea being colder than the Mediterranean, flows into the latter.

It appears from meteorological tables, that the eastern part of North America has a much colder air than the opposite European coast, and falls short of the standard by about ten or twelve degrees. There are several causes which produce this considerable difference. The greatest elevation in North America is between the 40th and 50th degree of north latitude, and the 100th and 110th of longitude west from London, and there the most considerable rivers have their origin. The height alone is sufficient to make this tract colder than it would otherwise be; but there are other causes, and those are most extensive forests, and large swamps and morasses, each of which exclude heat from the earth, and consequently prevent it from ameliorating the rigour of winter. Many extensive lakes lie to the east, and Hudson's Bay more to the north; a chain of mountains extend on the south of the latter, and those equally prevent the accumulation of heat; besides, this bay is bounded on the east by the mountainous country of Labrador, and has many islands; from all which circumstances arise the lowness of the temperature, and the piercing cold of the north-west winds. The annual decrease of the forests for the purpose of clearing the ground, and the consumption for building and fuel, is supposed to have occasioned a considerable decrease of cold in the winter; and if this should be the result, much will yet be done towards bringing the temperature of the European and American continents to something like a level.

Continents have a colder atmosphere than islands situated in the same degree of latitude; and countries lying to the windward of the superior classes of mountains, or forests, are warmer than those which are to the leeward. Earth always possessing a certain degree of moisture, has a greater capacity to receive and retain heat than sand or stones, the latter therefore are heated and cooled with more rapidity: it is from this circumstance that the intense heats of Africa and Arabia, and the cold of Terra del Fuego, are derived. The temperature of growing vegetables changes very gradually; but there is a considerable evaporation from them: if these exist in great numbers, and congregated, or in forests, their foliage preventing the rays of the sun from reaching the earth, it is perfectly natural that the immediate atmosphere must be greatly affected by the ascent of chilled vapours.

Our next object is the ascent and descent of water. The first-mentioned operation of this fluid has been noticed already. See EVAPORATION.

Dews, the effect of the same cause, are variously accounted for by different observers of nature; the general result, however, seems to be, that they are the last feeble efforts of evaporation, which deprived of their warm stimulus by the approach of night, fall through the chill of the air in extremely small and distinct globules, covering every substance with that trembling and brilliant lustre which rain is incapable of affording through the weight of each drop. According to Hales 3.28 inches of dew annually falls on the earth; but Dalton asserts that the quantity is about 5 inches in the same period. M. Prevost made some curious experiments to ascertain why dew should be deposited on glass, when it did not adhere to metal almost in contact: plates of metal fixed on glass are sometimes covered by dew, and at others the case is reversed; in the latter instance they are bounded by a dry zone: if the other surface of the glass is exposed, the part opposed to the metal remains perfectly dry; and if the metal is applied again, it will not prevent the deposition. The experiment may be made at a window when moisture attaches to either side. M. Prevost observes that glass is covered externally, even when the air is warmest within the house, and that metal fixed internally receives more moisture than the glass. After pursuing the subject to its utmost limits, this gentleman concludes that the phenomena are entirely the effect of the action of heat. That description of dew known by the name of honey-dew is attributed to insects.

The strata of air near the surface of the earth unquestionably contains more moisture, or vapour, than the higher parts of the atmosphere. The regions above the summits of mountains are probably very dry; and De Luc and Saussure say, the air on those they explored was less impregnated with vapour in the night than during the day; for as the stratum next the earth condenses and cools at the former period, there can be no doubt that each stratum descends, yet as clouds are seen to tower far above the most elevated peaks, vapour must at particular times rise to an amazing height.

Rain never descends till the transparency of the air ceases, and the invisible vapours become vesicular, when clouds form, and at length the drops fall: clouds, instead of forming gradually at once throughout all parts of the horizon, generate in a particular spot, and imperceptibly increase, till the whole expanse is obscured. It is singular that clouds collect and spread at a considerable height in the atmosphere, where the air is drier than in the lower strata, which are generally overcharged with moisture. "It is equally remarkable," says a late writer, "that the part of the atmosphere at which they form has not arrived at the point of extreme moisture, nor near that point, even a moment before their formation." Thus it appears that their formation does not proceed from a greater quantity of vapour accumulating than could remain in the atmosphere without passing its maximum. M. De Luc asserts, that the heat of clouds exceeds that of the surrounding air in some particular instances; hence their formation cannot arise from the capacity of air for combining with moisture being decreased by cold, as clouds may frequently be observed, which, after floating through the atmosphere during the heat of the day, disappear at night when the heat diminishes: thus we might proceed to prove that clouds do not originate in the way supposed by many observers, and that we are still ignorant in what manner vapour is disposed of after it enters the atmosphere; and why it rejects its assumed form, returns again to vapour, and falls in rain; and why evaporation should prevail during very hot and dry seasons, without visibly saturating the whole atmosphere. Theories in this instance are of very little use, as the subject is evidently placed too far out of our reach for experiment, in this state of uncertainty we must have recourse to facts.

The quantity of rain, taken at an annual mean, is the greatest at the equator, and it lessens gradu-

ally to the poles; but there are fewer days of rain there, the number of which increase in proportion to the distance from it. The Journal de Physique contains the following observations: "From north latitude 12° to 43°, the mean number of rainy days is 78; from 43° to 46°, the mean number is 103; from 46° to 50°, 134; and from 51° to 60°, 161." Winter often produces a greater number of rainy days than summer, though the quantity of rain is more considerable in the latter than in the former season: at Petersburg rain and snow falls on an average 84 days of the winter, and the quantity amounts to about five inches; on the contrary, the summer produces eleven inches in about the same number of days. Mountainous districts are subject to great falls of rain, among the Andes particularly it rains almost incessantly, while the flat country of Egypt is consumed by endless drought. The rain guage affords reason to suppose, that a greater quantity of rain falls in the lower strata of the atmosphere than in those above, which may be accounted for by the drops attracting vapour in their near approach to the earth, though it must be admitted, that Mr. Copland, of Dumfries, discovered the rain collected in the lower guage was greatest when it continued falling for some time, and that the greatest quantity was collected in the higher during short rains, or at the conclusion of lengthened ones.

As rain is known to fall at all hours of the day and night, and at every season of the year, it is apparent that it is caused by operations which prevail eternally, and without defined interruption. M. Toaldo seems to think that a greater quantity descends in the night than in the day; and it is certain that a south wind produces more rain than any others, though it falls during the prevalence of every wind: heavy falls also occur in the most complete calms. M. Cotte published a paper in the Journal de Physique, from which it appears that the mean quantity of rain descending at 147 places, between latitude 11° and 60° north, is 34.7 inches. "Let us suppose then," observes Dr. Thomson, "(which cannot be very far from the truth) that the mean annual quantity of rain for the whole globe is 34 inches. The superfices of the globe consists of 170,981,012 square miles, or 686,401,498,471,475,200 square inches: the quantity of rain, therefore, falling annually will amount to 23,337,650,812,030,156,800 cubic inches, or somewhat more than 91,751 cubic miles of water."

There are 52,745,253 square miles of dry land on the globe; consequently the annual amount of the quantity of rain descending upon it will be 30,960 cubic miles. The sea is supposed to receive 13,140 cubic miles of water which flows into it annually; therefore it must supply an equal quantity by evaporation, or the land would be completely drained of every particle of moisture. Mr. Dalton estimates the quantity of rain falling in England at 31 inches.

Exclusive of the general appearance of vapour, when condensed into clouds, there are other forms in which the existence of moisture in the atmosphere is observable, particularly the halo, a luminous circle appearing under certain circumstances round the sun, moon, and stars. This has been almost universally ascribed to the rays of light issuing from those bodies passing through a frozen medium of hail or snow; and that this may be the case admits of very little doubt; but it is equally probable, that the rays of the sun breaking through an uniformly dense cloud, nearly exhausted by rain falling from it, may produce a similar effect on moisture in a fluid state, and this is demonstrated frequently by the sun appearing through such clouds. The parhelia, or mock sun, is another phenomenon, effected by the rays of the sun darted upon frozen or fluid particles of water on either side of that body; but the exact manner in which this appearance originates cannot, for obvious reasons, be ascertained.

A constant attendant upon each of the phenomena that we have attempted to illustrate is wind, the doctrine of which deserves every possible attention, as much of our comfort, and health, and commerce wholly depends upon it. Were it not for this agitation of the air putrid effluvia arising from the habitations of man, and from vegetable substances, besides the exhalations from water, would soon render it unfit for respiration, and a general mortality would be the consequence. In this instance also the philosopher finds his progress arrested, and his research bounded by insurmountable obstacles; still, however, there are many facts established that are highly satisfactory. The temperate zones are not under the influence of as regular winds as between the tropics: the *trade wind* prevails annually and regularly in those parts of the Pacific and Atlantic oceans which lie near the equator; it blows from the north-east within a few points on the north side of the equator, and from the south-east on the opposite side, and the interval space of these separate winds is from the second to the fifth degree of north latitude, and within the limits just mentioned, where the wind may be said never to blow from the north or the south; but there are dreadful storms, and perfect calms, equally dangerous and perplexing to the mariner, who finds the force of the trade winds decline as he approaches their boundary. Between the tenth and thirtieth degrees of south latitude the trade wind prevails in the Indian ocean; but north of it there is a change every half year, when they blow in an opposite direction to their previous course: these are termed monsoons, and their change is constantly productive of variable airs and storms of extreme violence, which frequently continue from five to six weeks, during which period the navigation is very dangerous. The monsoons take place one on the south and the other on the north side of the equator in the Indian ocean, and they extend to the eastern coast of China, and the longitude of New Holland, from Africa: they, however, suffer partial changes through local circumstances. They are, besides, not altogether confined to the space just mentioned, as the wind blows from the east or north-east between September and April, and for the remainder of the year from the south-west on the coast of Brazil, between cape St. Augustine and the isle of St. Catherine. Having thus directed the attention of the reader to this part of the subject, we shall pass to the prevailing winds of our native country, which were ascertained by order of the Royal Society of London, which learned body published the following result in their Transactions.—At London.

Winds.	Days.	Winds.	Days.
South-west	112	South-east	32
North-east	58	East	26
North-west	50	South	16
West	53	North	16

The same register shews, that the south-west wind blows more upon an average in each month of the year than any other, particularly in July and August; that the north-east prevails during January, March, April, May, and June, and is most unfrequent in February, July, September, and December; the north-west occuring more frequently from November to March, and less so in September and October than in any other months. In the fifth volume of the Statistical Account of Scotland there is a table of seven years close observation made by Dr. Meek, near Glasgow, the average of which is stated as follows:

Winds.	Days.	Winds.	Days.
South-west	174	North-east ..	104
North-west	40	South-east ...	47

In Ireland the prevailing winds are the west and south west. The different degrees of its motion next excites our attention; and it seems almost superfluous to observe, that it varies in gradations from the gentlest zephyr, which plays upon the leaves of plants, gently undulating them, to the furious tempest, calculated to inspire horror in the breast of the most callous: it is also a most remarkable fact, that violent currents of air pass along, as it were within a line, without sensibly agitating that beyond them. An instance of this kind occurred at Edinburgh, when the celebrated aeronaut Lunardi ascended in his balloon, which was conveyed with great velocity by the wind at the rate of 70 miles an hour, while a perfect calm existed in the city and neighbourhood.

There are many circumstances attending the operations of the air, which we term wind, that serve for a basis for well-founded conjectures, and those united to the result of daily observation, render the explanation of its phenomena tolerably satisfactory. It must be clear to the most common capacity, that as the rays of the sun descend perpendicularly on the surface of the earth under the torrid zone, that part of it must receive a greater portion of heat than those where they fall obliquely; the heat thus acquired communicates to the air, which it rarifies and causes to ascend, and the vacuum occasioned by this operation is immediately filled by the chill air from the north and south. The diurnal motion of the earth gradually lessens to the poles from the equator: at that point it moves at the rate of fifteen geographical miles in a minute: this motion is communicated to the atmosphere in the same degree; therefore if part of it was conveyed instantaneously from latitude 30° it would not directly acquire the velocity of that at the equator; consequently the ridges of the earth must meet it, and give it the appearance of an east wind; the effect is similar upon the cold air proceeding from the north and south, and this similarity must be admitted to extend to each place particularly heated by the beams of the sun.

The moon being a large body, situated comparatively near the earth, is known to affect the atmosphere in its revolutions by the pressure of that upon the sea, so as to cause the flux and reflux of it, which we term tides: it cannot, therefore be doubted, that some of the winds we experience are caused by her motion.

The regular motion of the atmosphere, known by the name of land and sea-breezes, may be accounted for upon the above principle: the heated rarified land air rises, and its place is supplied by the chill damp air from the surface of the sea; that from the hills in the neighbourhood becoming cold and dense in the course of the night, descend and press upon the comparatively lighter air over the sea, and hence the land breeze. Granting that the attraction of the moon, and the diurnal movement of the sun, affects our atmosphere, there cannot be a doubt but a westward motion of the air must prevail within the boundaries of the trade winds, the consequence of which is an easterly current on each side; from this then it proceeds that south-west winds are so frequent in the western parts of Europe, and over the Atlantic ocean. Mr. Kirwan attributes our constant south-west winds, particularly during winter, to an opposite current prevalent between the coast of Malabar and the Moluccas at the same period: this, he adds, must be supplied from regions close to the pole, "which must be recruited in its turn from the countries to the south of it in the western parts of our hemisphere."

The variable winds cannot be so readily accounted for, yet it is evident that though they seem the effect of capricious causes, they depend upon a regular system arranged by the great Author of nature. That accurate and successful observer of part of his works, the celebrated Franklin, discovered in 1740 that winds originate at the precise point towards which they blow. This philosopher had hoped to observe an eclipse of the moon at Philadelphia, but was prevented by a north-east storm that commenced at seven in the evening. This he afterwards found did not occur at Boston till eleven, and upon enquiry he had reason to suppose it passed to the north-east at the rate of about 100 miles an hour. The manner in which he accounts for this retrograde proceeding is so satisfactory, that we shall give it in his own words, particularly as his assertions are supported by recent observations both in America and Scotland. He argued thus: "I suppose a long canal of water, stopped at the end by a gate. The water is at rest till the gate is opened; then it begins to move out through the gate, and the water next the gate is first in motion, and moves on towards the gate; and so on successively, till the water at the head of the canal is motion, which it is last of all. In this case all the water moves indeed towards the gate, but the successive times of beginning the motion are in the contrary way, viz. from the gate back to the head of the canal. Thus, to produce a north-east storm, I suppose some great rarefaction of the air, in or near the Gulph of Mexico; the air arising thence has its place supplied by the next more northern, cooler, and therefore denser and heavier air; a successive current is formed, to which our coast and inland mountains give a north-east direction." According to the observations made by captain Cook, the north-east winds prevail in the Northern Pacific ocean during the same spring months they do with us, from which facts it appears that the cold air from America and the north of Europe flows at that season into the Pacific and Atlantic oceans. (*British Encyclo.*) For more on this subject, see Rain, Weather, Wind, &c.

METEOROMANCY, a species of divination by meteors, principally by lightning and thunder: this method of divination passed from the Tuscans to the Romans, with whom, as Seneca informs us, it was held in high esteem.

METE'OROUS. *a.* (from *meteor.*) Having the nature of a meteor (*Milton*).

METER. *s.* (from *mete.*) A measurer.

METEWAND. · ME'TEYARD. *s.* (*mete* and *yard*, or *wand.*) A staff of a certain length wherewith measures are tak (*Ascham. Leviticus*).

METHE'GLIN. *s.* (*meddyglyn*, Welsh.) Drink made of honey boiled with water and fermented. See MEAD.

METHI'NKS, *verb impersonal.* I think; it seems to me; meseems (*Spenser*).

METHOD. METHODUS. (from μεθοδος.) In logic and rhetoric, the art or rule of disposing things in such a manner, as that they may be easily comprehended; either in order to discover the truth, which we ourselves are ignorant of; or to shew and demonstrate it to others when known, or to fix it in the memory. See DISPOSITION. Gassendus distributes method, with regard to its object, into three kinds, or branches; viz. *methodus inventionis*, the method of invention, or discovering a truth unknown.

Methodus judicii, the method of judging or determining of a truth, or proposition, proposed.

And *methodus demonstrationis*, or method of demonstration; that is, of exhibiting it to another.

Method is distributed by others into two general kinds, viz. natural and arbitrary. Natural method is that which observes the order of nature, and proceeds in such a manner, as that the knowledge of things which follow depends in a great measure on the things which go before. Arbitrary method leaves the order of nature, and accommodates itself to many purposes: as to treasure up things, and retain them in the memory; to harangue and persuade mankind to any practice in the religious or civil life; or to delight, amuse, entertain the mind. This kind of method is chiefly pursued in poetry and oratory.

METHO'DICAL. *a.* (*methodique*, Fr.) Ranged or proceeding in due or just order (*Addison*).

METHO'DICALLY. *ad.* According to method and order (*Suckling*).

To ME'THODISE. *v. a.* (from *method.*) To regulate; to dispose in order (*Addison*).

METHODISTS, in ecclesiastical history, is a denomination applied to different sects, both papists and protestants. The popish methodists were those polemical doctors, of whom the most eminent arose in France towards the middle of the seventeenth century, in opposition to the Huguenots or protestants. The methodists, from their manner of treating the controversy with their opponents, may be divided into two classes. The one may comprehend those doctors, whose method of disputing with the protestants was disingenuous and unreasonable, and who followed the examples of those military chiefs, who shut up their troops in intrenchments and strong holds, in order to cover them from the attacks of the enemy. Of this number were the jesuit Veron, who required the protestants to prove the tenets of their church by plain passages of scripture, without being allowed the liberty of illustrating those passages, reasoning upon them, or drawing any conclusions from them; Nihusius, an apostate from the protestant religion; the two Walenburgs, and others who confined themselves to the business of answering objections and repelling attacks; and cardinal Richelieu, who confined the whole controversy to the single article of the divine institution and authority of the church. The methodists of the second class were of opinion, that the most expedient manner of reducing the protestants to silence, was not to attack them by piecemeal, but to overwhelm them at once, by the weight of some general principle or presumption, some universal argument, which comprehended, or might be applied to all the points contested between the two churches: thus imitating the conduct of those military leaders, who, instead of spending their time and strength in sieges and skirmishes, endeavoured to put an end to the war by a general and decisive action. These polemics rested the defence of popery upon prescription; the wicked lives of protestant princes who had left the church of Rome; the crime of religious schism; the variety of opinions among protestants, with regard to doctrine and discipline; and the uniformity of the tenets and worship of the church of Rome. To this class belong Nicolle, the Jansenist doctor, the famous Bossuet, &c. Mosh. Eccl. Hist. vol. iv. p. 307, &c. 8vo.

The protestant methodists in this country form a large part of the community. In the year 1729, they sprang up at Oxford, under Mr. Morgan (who soon after died) and Mr. John Wesley. In the month of November of that year, the latter being then fellow of Lincoln college, began to spend some evenings in reading the Greek New Testament along with Charles Wesley, student, Mr. Morgan, commoner, of Christ Church, and Mr. Kirkham, of Merton college. Next year, two or three of the pupils of Mr. John Wesley, and one pupil of Mr. Charles Wesley, obtained leave to attend these meetings. Two years after they were joined by Mr. Ingham, of Queen's college, Mr. Broughton, of Exeter, and Mr. James Hervey; and in 1735, they were joined by the celebrated Mr. Whitfield, then in his eighteenth year. They soon obtained the name of methodists, from the exact regularity of their lives; which gave occasion to a young gentleman, of Christ Church, to say—"Here is a new set of methodists sprung up!" Alluding to a sect of ancient physicians, who practised medicine by method or regular rules, in opposition to quackery or empiricism. Thus was the term methodist originally applied to this body of Christians, on account of the methodical strictness of their lives; but is indeed now, by the irreligious, indiscriminately appropriated to every individual who manifests a more than ordinary concern for the salvation of mankind. These heads differing soon afterwards in religious sentiments, their respective followers distributed themselves into two parts; the one under Mr. George Whitfield, the other

under Mr. John and Charles Wesley. Educated at Oxford, these leaders still continued to profess an attachment to the articles and liturgy of the established church, though they more commonly adopted the mode of worship which prevails among the dissenters. Upon their being excluded from the pulpits in many churches they took to preaching in the fields; and from the novelty of the thing, in conjunction with the fervour of their exertions, they were attended by some thousands of people. In their public labours, Mr. Whitfield having a most sonorous voice, was remarkable for an engaging and powerful eloquence; whilst Mr. John Wesley, being less under the influence of his passions, possessed both in writing and preaching a perspicuous and commanding simplicity. Even their enemies confess that they contributed in several places to reform the lower classes of the community. The colliers at Kingswood, near Bristol, and the tinners in Cornwall, were greatly benefited by their exertions. In consequence of their attention to the religion of Jesus, by the instrumentality of these preachers, many of them rose to a degree of respectability and became valuable members of society. The followers of Mr. Wesley (who died in London, 1791, aged eighty-eight, and was buried in the ground belonging to his chapel, the foundery in Moorfields) are Arminians, though some of his preachers incline to Baxterianism. The followers of Mr. Whitfield (who died in 1770, aged fifty-six, at Newbury Port, near Boston, in New England, and was buried there) are Calvinists, and were warmly patronized by the late countess dowager of Huntingdon, to whom Mr. W. was chaplain, and who was a lady of great benevolence and piety. Lady Erskine (a near relation of the celebrated counsellor of that name) took her situation, and was said to be equally attentive to the concerns of this part of the religious community. With respect to the splitting of the Methodists into Calvinists and Arminians, it happened so far back as the year 1741; the former being for particular, and the latter for universal, redemption.

Both Mr Wesley and Mr. Whitfield were indefatigable in promoting their own views of the Christian religion, notwithstanding all the reproaches with which they were stigmatized. It is well known that for this purpose they went over several times to America. Mr. Whitfield, indeed, established an orphan house in Georgia, for which he made large collections in this country, and which was since converted into a college for the education of young men, designed chiefly for the ministry. This college has been lately burnt down.

In America the methodists were extremely useful, riding 20 or 30 miles in the course of the day, and preaching twice or thrice to considerable congregations. The account of their labours by Mr. Hampson, in his memoirs of Mr. Wesley, is interesting and impressive. "Their excursions (says he) through immense forests, abounding in trees of all sorts and sizes, were often highly romantic. Innumerable rivers and falls of water; vistas opening to the view, in contrast with the uncultivated wild; deer now shooting across the road, and now scouring through the woods, while the eye was frequently relieved by the appearance of orchards and plantations, and the houses of gentlemen and farmers peeping through the trees, formed a scenery so various and picturesque, as to produce a variety of reflections, and present, we will not say to a philosophic eye, but to the mind of every reasonable creature, the most sublime and agreeable images. Their worship partook of the general simplicity. It was frequently conducted in the open air. The woods resounded to the voice of the preacher, or to the singing of his numerous congregation, whilst the horses fastened to the trees formed a singular addition to the solemnity. It was, indeed, a striking picture, and might naturally impress the mind with a retrospect of the antediluvian days, when the hills and vallies re-echoed the patriarchal devotions, and a Seth or an Enoch, in the shadow of a projecting rock, or beneath the foliage of some venerable oak, delivered his primeval lectures, and was a preacher of righteousness to the people!"

The distinguishing principles of methodism are, salvation by faith in Jesus Christ; perceptible, and in some cases instantaneous conversion; and an assurance of reconciliation to God, with which, they say, the new birth, or being born again, is inseparably attended. On these doctrines they lay the utmost stress. Several persons have written the life of Mr. Wesley; there is one by Mr. Hampson, another by Dr Whitehead, and a third by Dr. Coke and Mr. Moor. Mr. Whitfield's life was drawn up by the late Dr. Gillies, of Glasgow. Mr. Wesley and Mr. Whitfield both published an account of their travels and itinerant labours in this kingdom and in America. These sketches are entitled Journals, and serve greatly to illustrate the principles and progress of methodism.

The Wesleyan methodists are now so exceedingly more numerous than the followers of Whitfield, that the term methodists is now almost constantly confined to the former. They are incorporated into a regular and compact body, and have adopted a system of church-government which has a wonderful tendency to unite the members to each other. Their meetings for worship and for business are of various kinds, and are distinguished into prayer-meetings, class-meetings, band-meetings, watch-nights, love feasts, yearly-covenants, quarterly-meetings, district-meetings, and annual conferences. Their church officers are denominated travelling preachers, who are divided into superintendants and helpers; local preachers, who follow some secular employment, and never travel; class leaders, prayer leaders, or exhorters; band leaders, trustees, and stewards. For the more easy management and union of the whole connection the kingdom is divided into districts, comprehending generally three, four, or more circuits, the whole being under the immediate superintendance of the confer-

ence, which is assembled annually, and consists of one hundred travelling preachers, at first nominated in the will of the late reverend John Wesley, their numbers being regularly filled up by ballot.

The following is an accurate statement of the number of preachers and people in the Wesleyan connection of methodists, at the close of the sixty-third annual conference, held in August 1806:

In Great Britain		110,803
In Ireland		23,773
Gibraltar		40
Nova Scotia, New Brunswick, and Newfoundland . .		1,418
West India—whites	1,775	14,940
Coloured people, &c.	13,165	
United States—whites	95,628	119,944
Coloured people, &c.	24,316	
Total		270,918

At the close of the 67th annual conference, held at London in July 1810, the subjoined numbers were published:

In Great Britain . . .	138,000
Gibraltar	50
Ireland, about	29,000
West India islands—whites .	1,460
Ditto, men of colour . .	10,850
Nova Scotia and Newfoundland	2,500
United States	132,000
Total	313,860

In addition to these may be added about 110,000 adult hearers—methodists in religious sentiment; though, from various causes, prevented from formally joining the societies. To these still further may be added about 218,000 more, composed of the younger branches of families, and those generally influenced by the methodist doctrines. About 6000 more may be added, from methodists, who, from some slight difference as to discipline, &c. have formed themselves into independent societies in various parts of the united kingdoms: not now to reckon the methodists of the new connection. The local and travelling preachers, belonging to the different methodist societies, amount to about 1800. Some of these, as Dr. Adam Clarke, Dr. Coke, Mr. Benson, and Mr. Bunting, are men of considerable talents and extensive learning. But many of them, it must be confessed, are extremely illiterate, and have therefore nothing to recommend them but their piety and zeal, of which qualities most of them possess a very extraordinary portion.

Those who wish to know more of this numerous class of Christians may read Benson's Apology for the People of Methodists; and a very striking disquisition on the Evangelical Sects in No. 8 of the Quarterly Review, in which the good and the evil that may result from the farther extension of Westleyan Methodism are appreciated in a masterly, and, in the main, candid manner. As to the work published by Nightingale, under the title of a Portraiture of Methodism, it is but just to say that its author was once a local preacher in that connection, but is now a disciple of Unitarianism. He therefore, under the assumed garb of candour and friendship to the methodists, lampoons them and extols the Socinians; instead of being the historian of the methodists, he is their calumniator; and seems to have written his book only with two objects, to get money, and by the artful intertwining of truth and misrepresentation to render the methodists, their "Adonis's," their "sad rakes among the ladies," &c. &c. contemptible in the eyes of the world.

The methodists have recently found an eloquent advocate in William Wilberforce, Esq. M. P. who pleads their cause at some length, in his treatise on Vital Christianity.

The new methodist connection, among the followers of Mr. Wesley, separated from the original methodists in 1797. The grounds of this separation they declare to be church government, and not doctrines, as affirmed by some of their opponents. They object to the old methodists for having formed a hierarchy or priestly corporation; and say, that in so doing they have robbed the people of those privileges, that, as members of a Christian church, they are entitled to by reason and scripture. The new methodists have therefore attempted to establish every part of their church government on popular principles, and profess to have united as much as possible the ministers and the people in every department of it. This is quite contrary to the original government of the methodists, which in the most important cases, is confined only to the ministers. This, indeed, appears most plainly, when their conference or yearly meeting is considered; for in this meeting, no person, who is not a travelling preacher, has ever been suffered to enter as a member of it. And, indeed, this is the point to which the preachers have always stedfastly adhered with the utmost firmness and resolution, and on which the division at present entirely rests. They are also upbraided by the new methodists for having abused the power they have assumed: a great many of these abuses the new methodists have formally protested against, which are enumerated in various publications, and particularly in the preface to the life of one of their deceased friends, Mr. Alexander Kilham.

The new methodists profess to proceed upon liberal, open, and ingenuous principles, in the construction of their plan of church government; and their ultimate decision in all disputed matters, is, in their popular annual assembly, chosen by certain rules from among the preachers and societies. These professions are at least generous and liberal; but as this sect has yet continued for only a short season, little can be said of it at present. It becomes matter of curious conjecture and speculation, how far the leading persons among them will act agreeably to their present liberal professions. The number of persons who have joined this secession from the methodists

amount to about 7000. During the life of Mr. Kilham they published an interesting magazine, called the Methodist Monitor. We believe this work has been since discontinued.

METHODIUS, a father of the church, bishop of Olympus or Patara in Lycia, and afterward of Tyre in Palestine, suffered martyrdom at Chalcis in Greece towards the end of Dioclesian's persecution in the year 302. He composed many works in a clear and elaborate style, which were extant in Jerome's time. Father Combesis collected several considerable fragments of this writer, cited by Epiphanius, Photius, and others; and printed them with notes of his own, together with the works of Amphilochius, and Andreas Cretensis, in folio, Paris, 1644.

METHOUGHT. The *pret.* of *methinks*.

METHVEN, a town of Scotland, in Perthshire, with an ancient castle. It has manufactures of broad and narrow linen; with two paper and some other mills. King Robert Bruce, soon after his coronation in 1306, was defeated here by the English troops under the earl of Pembroke, and found himself forsaken by the greater part of his army. It is six miles W.N.W. of Perth.

METHUSELAH, the son of Enoch and father of Lamech, was born in the year of the world 687, begat Lamech in 874, and died in 1656, being the very year of the deluge, at the age of 969, which is the greatest age that has been attained to by any mortal man upon earth. (Gen v. 21, 22, &c.) According to the text of the Septuagint, Methuselah must have lived 14 years after the deluge; and according to other copies he died six years before it: but it is generally agreed on, that these copies, as well as the Septuagint, are corrupted in this place.

METHWOLD, a town in Norfolk, with a market on Tuesday, 15 miles N.W. of Thetford, and 86 N.N.E. of London. Lon. 0. 40 E. Lat. 52. 34 N.

METHYMNA, (anc. geog.) a town of the island of Lesbos. It was the second city of the island in greatness, population, and opulence. Its territory was fruitful, and the wines it produced excellent. It was the native place of Theophrastus, and of Arion the musician. When the whole island of Lesbos revolted from the power of the Athenians, Methymna alone remained firm to its ancient allies.

METIUS (James), of Alcmaer, in Holland, the inventor of telescopes with glasses, one of which he presented to the States-General in 1609. Tubes, extended, by uniting them, to a great length, were known to the ancients; but Metius was the first who added glasses, and he was indebted to chance for the discovery: he had frequently observed some school-boys playing upon the ice, who made use of their copy-books rolled up in the shape of tubes, to look at each other, to which they sometimes added pieces of ice at each end, to view distant objects: this led him to the invention of telescopic lenses.

METON, an Athenian mathematician, who invented what is called in chronology the golden number. He flourished B.C. 432.

METONY'MICAL. *a.* (from *metonymy*.) Put by metonymy for something else.

METONY'MICALLY. *ad.* By metonymy; not literally (*Boyle*).

METO'NYMY. *s.* (μετωνυμία.) A rhetorical figure, by which one word is put for another, as the matter for the materiate: *he died by steel*, that is, by a sword.

METOPO'SCOPY. *s.* (μέτωπον and σκοπέω.) The study of physiognomy.

METRE, or METER, Μετρον, in poetry, denotes a system of feet of a just length. Aristides defines metre, a system of feet composed of dissimilar syllables, of a just extent. In which sense metre amounts to much the same with genus carminis, or the sort of verse, and differs from rhythm.

METRE, in the new French measure, is the ten-millionth part of the distance between the equator and the north pole. See MEASURES.

METRIC. An epithet applied by the ancient Greeks to that part of their music which had for its object the letters, syllables, feet, and verses, of the poem. The metric differed from the rhythmic in that the former was only used in the form of the verses, while the second was confined to the feet of which they are composed.

METRICAL. *a.* (*metricus*, Latin.) 1. Pertaining to metre or numbers. 2. Consisting of verses.

METRITIS. (*metritis*, μητρῖτις; from μήτρα, the womb.) Inflammation of the uterus. See HYSTERITIS.

METRODORUS, a disciple of Democritus, and master of Anaxarchus and Hippocrates. He was a physician of Chios, and held the eternity of the universe.

METRODORUS, a famous painter and philosopher of Stratonice, B. C. 171. He was sent to Paulus Æmilius, who, after the defeat of Perseus, demanded of the Athenians a painter and philosopher; the former to paint his temples, and the latter to instruct his children. Metrodorus fully satisfied him in both capacities.

METROPOLIS (from μήτηρ, *mother*, and πόλις, *city*), the capital of a country or province, or the principal city; and, as it were, mother of all the rest. The term metropolis is also applied to archiepiscopal churches, and sometimes to the principal or mother-church of a city. The Roman empire having been divided into 13 dioceses and 120 provinces, each diocese and each province had its metropolis or capital city, where the proconsul had his residence. To this civil division the ecclesiastical was afterwards adapted, and the bishop of the capital city had the direction of affairs, and the pre-eminence over all the bishops of the province. His residence in the metropolis gave him the title of metropolitan. This erection of metropolitans is referred to the end of the third century, and was confirmed by the council of Nice. A metropoli-

tan has the privilege of ordaining his suffragans; and appeals from sentences passed by the suffragans are preferred to the metropolitan.

METROPO'LITAN. *s.* (*metropolitanus*, Latin.) A bishop of the mother church; an archbishop (*Clarendon*).

Metropo'litan. *a.* Belonging to a metropolis (*Raleigh*)

METROPOLI'TICAL. *a.* (from *metropolis*.) Chief or principal of cities (*Knolles*).

METROPTOSIS. (*metroptosis*, μετροπτωσις, from μητρα, the uterus, and πιπτω, to fall down). Prolapsis uteri. The descent of the uterus through the vagina.

METROSIDEROS, in botany, a genus of the class icosandria, order monogynia Calyx five-cleft, half superior; petals five; stemens very long, exserted; stigma simple; capsule three or four-celled. Fourteen species. Trees and herbs of Australasia and Polynesia; some with opposite, others with alternate, leaves.

ME'TTLE. *s.* (corrupted from *metal.*) 1. Spirit; sprightliness; courage (*Pope*). 2. Substance (*Shakspeare*).

Mettle, a cant term among horse-dealers to express spirit or heart. There is great difference between a mettled horse, a horse of vigour, and a fiery horse; but as this is not sufficiently attended to in the purchase of this animal, some general rules for the distinguishing real vigour in a horse may be acceptable.

When a horse is standing still, the rider who has a mind to try whether he has vigour in him should keep him fast with the bridle-hand, and apply the spurs to the hair of his sides; this is called by horsemen pinching. If the horse be impatient under this, gathering himself up, and endeavouring to go forwards, and champs upon the bit, without thrusting out his nose, it is a sign of vigour and right mettle in him. Some caution is to be used, however, in judging by this, to distinguish between a horse that has vigour really in him, and one that has only a fine skin, and is rather ticklish than mettled. This is the case with a great many horses, and is found by their being very sensible of the touch of the spur, and shewing the appearance of a great deal of mettle and vigour, when touched, but immediately losing the apprehension of it. These are, in fact, of a dull disposition, and only have a tender skin.

The mettled horse is to be highly valued; but the fiery one is good for nothing. A horse that is truly vigorous should be calm and cool; he should in general move on patiently, and only shew his mettle when it is required of him.

The surest method is to choose such horses as are extremely apprehensive of strokes, and are afraid at the least appearance of their coming. These, at only the closing of the legs and thighs, seem to be seized with fear and alarmed, but that without fretting or fierceness. A horse that walks deliberately and securely, and that, without requiring the whip too often, will go on briskly and without fretting; will go on from the walk to the gallop, and as easily from the gallop to the walk again, and continually champs upon the bit, and trots with freedom, upon the shoulders easily, and snorting a little through his nostrils: this is generally a creature of true mettle and vigour, though it does not rise to such a fierceness as is troublesome or dangerous. If to these good qualities a horse be well upon his haunches, and have a light and easy stop, his head well placed and firm, and the feeling of his bit equal and just, the buyer will seldom need to complain of the price.

METTLED. *a.* (from *mettle.*) Sprightly; courageous; full of ardour (*B. Jonson*).

METTLESOME. *a.* (from *mettle.*) Sprightly; lively; gay; brisk; airy (*Tatler*).

METTLESOMELY. *ad.* With sprightliness.

METZ, an ancient and strong town of France, in the department of Moselle, with a bishop's see, whose bishop had the title of a prince of the empire. The cathedral is one of the finest in Europe. The Jews, about 3000, live in a part of the town by themselves, where they have a synagogue. The sweetmeats made here are in high esteem. Metz was formerly the capital of the kingdom of Australia; its fortifications are excellent, and it has one of the strongest citadels in Europe. The inhabitants are computed at 40,000, beside a numerous garrison, who have noble barracks It is seated at the confluence of the Moselle and Seille, 25 miles N.W. of Nanci, and 190 N.E. of Paris. Lon. 6. 16 E. Lat. 49. 7 N.

METZU (Gabriel), an eminent painter, was born at Leyden in 1615. His subjects were usually taken from low life; but they were all designed after nature, and surprisingly well represented; such as women selling fish, fowls, or hares; sick persons attended by the doctor; chemists in their laboratories; dead game; painters' rooms, shops, and drawing-schools hung with prints and pictures; all which subjects he composed well, and finished them with extreme neatness; as he likewise did his portraits. He spent a great deal of time on his pictures, which has occasioned their scarcity and dearness at this time; and besides, it is confidently said, that the Dutch prevent their being carried out of their own country as much as possible. So that those paintings of Metzu, which are sometimes seen in the collections of our kingdoms, are either obtained by chance, or purchased at large prices. Though it ought also to be remembered, that the value set upon the works of this master throughout Holland and Flanders has induced several painters to endeavour at imitating and copying his works, which having gradually circulated abroad, and being a little mellowed by time, are now called originals. He died in 1658.

MEU. See Meum athamanticum.

MEUDON, a village of France, where was a magnificent royal palace on the Seine, six miles S.E. of Paris.

MEULAN, an ancient town of France, in the department of Seine and Oise. It is built

in the form of an amphitheatre, on the river Seine, over which are two bridges, 20 miles N.W. of Paris. Lon. 1. 57 E. Lat. 49. 1 N.

MEUM ATHAMANTICUM. (*meum*, *μηον*, or *μειον*; from *μειων*, less, so called, according to Minshew, from its diminutive size.) *Meu*. Spignel. Baldmoney. The root of this plant, *æthusa mæum*, is recommended as a carminative, stomachic, and for attenuating viscid humours, and appears to be nearly of the same nature as lovage, differing in its smell, being rather more agreeable, somewhat like that of parsnips, but stronger, and being in its taste less sweet, and more warm or acrid.

MEURS, a town of Germany, in the duchy of Cleves, seated on the Rhine, 15 miles N W. of Dusseldorf. Lon. 6. 41 E. Lat. 51. 25 N.

MEURSIUS (John), a learned Dutchman, born in 1579. He received his academical education at Leyden, where he wrote, when only sixteen, a Commentary on Lycophron. In 1610 he was appointed professor of history, and afterwards of Greek. He was also chosen historiographer of the United States. Meursius suffered much persecution in consequence of his connection with Barneveldt; on which he left his country, and went to Denmark, where he died in 1639. He excelled in his knowledge of the Greek language, and antiquities. His works are very numerous and valuable; the best is his Elusinea sive de Cereris, Eleusiniæ sacro et sesto.

MEURTHE, a department of France, including part of the late province of Lorrain. It is so called from a river that rises in the department of the Vosges, and watering Luneville and Nanci falls into the Moselle. Nanci is the principal see of this department.

MEUSE, a department in France, including the late duchy of Bar. It takes its name from the river Meuse, or Maese. Bar-le-Duc is the capital. See MAESE.

MEUSE. (*mews*, from *mew*.) A narrow opening at the bottom of quickset and other hedges, as well as in the bushy underwood of coverts, through which hares take their track, when going to, or coming from, feed during the night. At these meuses the expert and experienced poacher fixes his wires (commonly called snares) with so much security and success, as generally to repay himself well for his labour.

MEUSNIER (Philip), a French painter of architecture, was the pupil of James Rousseau. He was a member of the French academy, and patronized by Louis XIV. and XV. He died at Paris in 1734, aged 79.

To MEW. *v. a.* (from the noun.) 1. To shut up; to confine; to imprison; to enclose (*Spenser*). 2. To shed the feathers (*Walton*). 3. (*miauler*, Fr.) To cry as a cat (*Grew*).

MEW, in ornithology. See LARUS.

MEWARI, a considerable town of Japan, in the island of Niphon, with a royal palace. It is seated on a hill, at the foot of which are vast fields of wheat and rice, with fine orchards, full of excellent plums.

MEWAT, a hilly and woody tract of Hindustan Proper, lying on the S.W. of Delhi, confining the low country, along the W. bank of the Jumna, to a comparatively narrow slip, and extending westward 120 miles. From N. to S. it is 90 miles. Although situate in the heart of Hindustan, within 25 miles of its former capital (Delhi), its inhabitants, the Mewati, have been ever characterized as the most savage and brutal; and their chief employment has been robbery and plunder. In 1265, 100,000 of these wretches were put to the sword; but they are still so noted as thieves and robbers, that parties of them are taken into pay by the chiefs of Upper Hindustan, in order to distress the countries that are the seat of warfare. Mewat contains some strong fortresses on steep and inaccessible hills, and was almost entirely subject to the late Madagee Sindia, a Mahratta chief.

MEWAT-ALI, a town of Persia, in Irac-Arabia, not so considerable as formerly, but famous for the superb and rich mosque of Ali, to which the Persians go in pilgrimage from all parts. It is 100 miles S.W. of Bagdad. Lon. 42. 57 E. Lat. 32. 0 N.

MEWING. (this should be written muing, from the French *muer*.) Is an old forest term for a stag's shedding his horns.

MEWS. (from *mew*.) Is a receptacle for horses and carriages, appropriated to no other use whatever. The buildings consist of stables and coach-houses only, with conveniences above for the residence of coachmen and their families. In all the newly-erected squares and places at the western extremity of the metropolis, most of the houses are so constructed, that the master and servants have access to the stables by a communication at the back of the dwelling-house, without the inconvenience of passing through the streets.

To MEWL. *v. n.* (*miauler*, French.) To squall as a child (*Shakspeare*).

MEXICO, or NEW SPAIN, a country of N. America, bounded on the north-west by New Mexico, on the east by the Gulf of Mexico, on the south-east by the isthmus of Darien, and on the south and west by the Pacific ocean; about 550 leagues in length; the breadth is very unequal, in some parts 160 leagues, but towards the isthmus of Darien hardly twenty. The greater part being situated under the torrid zone, the heat is great, but generally moderated by partial or general rains, or by sea breezes, which blow alternately. In some districts the exhalation of lakes and rivers cool the air, and render it mild and agreeable. From February to April the air is burning during the day, no cloud intercepts the rays of the sun, lakes and rivers are dried up, and water can hardly be found. In April the rains commence, and continue till September, attended with dreadful thunder and lightning, inundating the low lands. Upon the east coast the soil is low, marshy, always inundated in the rainy seasons, and bounded by impenetrable forests; the prospect is gloomy, and the air unhealthy. In the interior parts the air is milder and more pure,

the soil fertile, and the country agreeably diversified; on the western coast the soil is good, the borders more elevated, and a greater variety is observed in the productions. The Spaniards have abandoned the east coasts; and the malignant air, forests almost impervious to man, morasses and inhospitable deserts, are a better security than fortresses and garrisons of soldiers. The mines of gold and silver are abundant, of the latter they count above a thousand; gold is found in the brooks and rivers, as well as in the mines: these mines are only found in barren rocks or mountains; some of the veins are followed to an astonishing depth, even to a thousand feet below the general surface of the earth. The person who discovers a mine has a right to work it, on paying to the king a tenth of its produce. This property includes a circle, whose diameter is 800 feet, beyond that another adventurer has a right to search. These are not the only riches produced; here are also mines of iron, copper, lead, alum, crystal, vitriol, different kinds of precious stones, emeralds, turquoises, jasper, porphyry, marble, fossil salt, &c. Mineral springs are abundant, and in several parts volcanos. No country produces a greater abundance of grain, fruits, or legumes; among the forest trees are the cedar, brazil-wood, mahogany, and many others unknown in Europe. Among the animals may be reckoned lions, tygers, wild-cats, bears, wolves, foxes, deer, goats, squirrels, rats, armadillos, hogs, &c. Mexico produces maize, wheat, barley, rice, peas, beans, and other grain; with a great variety of drugs since added to the European list, such as copal, anime, tacamahac, caranna, liquid amber, balsam of Tolu, guaiacum, mechoacan root, sarsaparilla, and many more. Other productions are cotton, which employs the manufacturers of the country, cochenil, cacao, honey, dying woods, tobacco, ginger, pearls, sugar, indigo, &c. Innumerable herds of cattle run wild in the savannas and woods, whose skins and fat form an important article of commerce. Sheep are numerous, but the wool is of little value; the lions are grey, and not so formidable as those of Africa; the tygers are smaller; bears are uncommon. Among the birds may be reckoned those of the domestic kind, goldfinches, nightingales, and upwards of twenty species of singing birds, pigeons, parrots, parroquets, eagles, vultures, pelicans, ravens, macaws, &c. &c. Serpents are numerous, as likewise scorpions, spiders, ants, and musquetos; and sometimes locusts, in the space of a night, will destroy the harvest of a district. In the rivers, in the lakes, and on the coasts, are found variety of fish, and a great number of alligators. The empire of Mexico was at first called *Anahac*, and does not appear to have been very ancient; it was occupied by different tribes, of which the most civilized formed themselves into societies. The Mexicans are said to come from the borders of the Gulf of California, and fixed themselves near a large lake, in the midst of which they founded the city of Mexico, which increased insensibly. For a long time they had no kings, only electing chiefs in time of war, but one of these contrived means to make his power continual and hereditary. Montezuma was the ninth in succession; these princes were despotic, fear was the support of their government The empire was not formed of the provinces which enjoyed the same laws; some of the provinces were only tributary, enjoying their own laws, others were governed by grandees named by the monarch. Agriculture was imperfect, and consisted principally in the cultivation of rice and cacao, which were the chief food of the people; the rich only indulged themselves in fowl, fish, and game, among which were reckoned small dogs; drunkenness was by all ranks held as an odious vice. They went almost naked; they painted their bodies, and ornamented their heads with feathers, their noses and their ears with bone and small works of gold. The king was only distinguished from the rest of the people by a cloak of knit cotton thrown over his right shoulder; his palace had no windows: the ordinary houses were huts, some of stone, the roofs covered with branches of trees; vessels of earth, mats, some seats of palm leaves, were the principal furniture; the arts of luxury were rude; their paintings were without grace, and without design; their application to history did honour to their genius; their wars and their funerals were bloody; their towns were extensive, but their houses scattered; their most beautiful temple was only partly built of stone, in which they placed a statue of their divinity, and upon his altars they sacrificed their victims. Their religion was atrocious and terrible; their divinities inspired terror, and seemed only to breathe vengeance; they were surrounded with serpents, tygers, and the most obnoxious animals. To these divinities, it is said, they sacrificed yearly 2000 human victims. Such, in general, was the state of Mexico when conquered by Cortez in the year 1519. The country was lately governed by a viceroy, who represented the king of Spain, and was as absolute in himself, in all things political, military, civil, and criminal; his allowable revenues were 40,000 ducats a year, his secret ones amounted to a much greater sum; his employment continues five years. Under him were three tribunals, called audiences, for the administration of justice; these audiences take their names from different cities, Mexico, Guadalajara, and Guatimala. The inhabitants of Mexico consist of native Spaniards, Creoles, who are the descendants of Spaniards, Mulattoes, the issue of an European and an African slave; Metiffs, born of an European and an Indian; Mestizes, the descendants of Metiffs; Terceroens, their descendants, Quarteroens, after which the fifth generation enjoys all the privileges of Creoles. They reckon in Mexico 500,000 Spaniards, one million of Negroes, Mulattoes, and Mestizes, and two million of Indians. The audience of Mexico contains the provinces of Mexico Proper, Mechoacan, Guasteca, Tlascala, Guaxaca, Tabasco, and Yucatan. This is the most important of the Spanish possessions to the north of the line,

and surpasses the other audiences in riches and extent.

Mexico proper, a province of North America, which is said to owe its name to an ancient idol, named Mixitli, from whence is formed the word Mexico. It is reported to exceed all the provinces in America in extensive beautiful vallies, rich arable lands, and delicious pasturage. Fruits are here in the greatest variety, perfection, and abundance; the great lakes, rivers, and the neighbourhood of the sea, afford fish of every kind. In a word, it enjoys every external and internal advantage, being washed towards the south by the Pacific ocean, by which means the inhabitants trade with the other maritime provinces, while the richness of the country furnishes every article of commerce, and the roads, lakes, and rivers, every requisite of domestic industry and intercourse. The climate is indeed variable: strangers complain of its excessive heat, while the natives frequently shiver with cold; however, both, who are blessed with sound constitutions, agree, that it is temperate and pleasant in general. The soil is so fruitful, that notwithstanding the great abundance of money, and the external luxury of the Mexicans, the necessaries of life are exceedingly reasonable, a pregnant proof of the plenty that reigns in the provinces. The silver mines are much richer than those of Mechoachan, or indeed of any other province of the empire, and their value is still augmented by the ore's containing a considerable portion of gold.

Mexico, a city of America, and capital of the government so called, situated on a vast lake, surrounded by high mountains. The situation is now, where it always was; the Spaniards not thinking it necessary to desert a city so well built and magnificent. In point of regularity it exceeds all the cities in the universe. The want of gates, walls, and artillery, together with the five great causeways leading to the city, render Mexico extremely remarkable. All the buildings are convenient, but the public edifices are magnificent. It is the see of an archbishop, and contains twenty-nine churches, and twenty-two monasteries and nunneries, of the opulence of which we may form some judgment from the revenue of the cathedral, that amounts to nearly 80,000l a year, out of which the archbishop has 15,000l. annually, besides vast sums that arise by way of perquisites. All the inhabitants are, indeed, immensely wealthy; and nothing can convey a higher idea of the vast grandeur and riches of Mexico than the prodigious quantities which are daily exposed to sale in the streets of the most valuable commodities of Europe and Asia. The great square in the middle of the town is extremely magnificent, and the palace of the marquis de Valle, as it is called; one of the noblest pieces of architecture any where to be met with. It is built in the very spot where formerly stood the palace of Motezuma, and occupies nearly the same space. Several of the hospitals are superb; but what most strikes the eyes of a traveller, is the vast abundance of silver, gold, and jewels, exposed in plate and toys in the streets, by the goldsmiths and shopkeepers; and though it has no seaport, nor any communication with the sea by navigable rivers, it enjoys a prodigious commerce, and is itself the centre of all that is carried on between America and Europe on one hand, and between America and the East Indies on the other. The goods from Acapulco to La Vera Cruz, or from La Vera Cruz to Acapulco, for the use of the Philippines, and in a great measure for the use of Peru and Lima, pass through this city, and employ an incredible number of horses and mules. Hither all the gold and silver is brought to be coined; here the king's fifth is to be deposited; and all that immense quantity of plate wrought which is annually sent into Europe. Lon. 100. 34 W. Lat. 20. 2 N.

Mexico (New), a large country of North America, bounded on the W. by the gulf of California, on the S. by New Spain, on the E. by Louisiana, and on the N. by unknown countries, so that its extent cannot be ascertained. Great encomiums have been lavished on the fertility of its soil, the richness of its mines, and the variety of its valuable products; and with respect to the favourableness of the climate, it may be sufficient to say, that this country lies within the temperate zone. It is chiefly inhabited by native Americans, hitherto unsubdued by the Spaniards. Santa Fé is the capital.

Mexico (Gulf of), that part of the Atlantic ocean, on the coast of North America, bounded on the S. and W. by Mexico, and on the N. by W. and E. Florida; the entrance lying to the E. between the S. coast of E. Florida, and the N.E. point of Jucatan.

MEYENBERG, a town of Upper Saxony, in the marche of Pregnitz, 21 miles N.E. of Perleberg, and 60 N.N.W. of Berlin. Lon. 12. 10 E. Lat. 53. 20 N.

MEYENFELDT, a town in the country of the Grisons, seated on the Rhine, in a pleasant country, fertile in excellent wine, 15 miles N.E. of Coire. Lon. 9. 36 E. Lat. 47. 2 N.

MEYER (James), a Flemish historian, born in 1491, near Bailleul, whence he is sometimes called Baliolianus. He was rector of Blankenberg, and died in 1552. His works are, 1. Annales Rerum Flandricarum, folio. 2. Flandricarum Rerum Decas, 4to.

MEYRVEIS, a town of France, in the department of Lozere, 23 miles S. of Mende, and 27 W. of Alais. Lon. 3. 18 E. Lat. 44. 10 N.

MEZANA, a town of Naples, in Basilicata, 17 miles S.S.W. of Tursi.

MEZEMNA, a seaport of Fez, on the coast of the Mediterranean, 80 miles E. of Tetuan. Lon. 4 1 W. Lat. 35. 22 N.

MEZEN, a seaport of Russia, in the government of Archangel, near the White sea, at the mouth of a river of the same name, 128 miles N.N.E. of Archangel. Lon. 43. 34 E. Lat. 66. 30 N.

MEZERAY (Francis Eudice de), an eminent French historian, was born at Rye, in

Lower Normandy, in 1610. He was the son of Isaac Eudes, a surgeon; but took the surname of Mezeray from a hamlet near Rye. Having performed his studies at Caen, he evinced a strong inclination to poetry: but going to Paris, he, by the advice of one of his friends, applied himself to the study of politics and history, and procured the place of commissary at war, which he held for two campaigns. He then shut himself up in the college of St. Barbe, in the midst of books and manuscripts; and in 1643 published the first volume of the History of France, in folio; and some years after, the other two volumes. Mezeray in that work surpassed all who had written the history of France before him, and was rewarded by the king with a pension of 4000 livres. In 1668 he published an abridgment of his History of France, in 3 volumes 4to. which was well received by the public: but as he inserted in that work the origin of most of the taxes, with very free reflections, Mr. Colbert complained of it, when Mezeray promised to correct what he had done in a second edition; but those corrections being only palliations, the minister caused half of his pension to be suppressed. Mezeray complained of this in very severe terms; when he obtained no other answer than the suppression of the other half. Vexed at this treatment, he resolved to write on subjects that could not expose him to such disappointments; and composed his treatise on the origin of the French, which did him much honour. He was elected perpetual secretary to the French academy, and died in 1683. He is said to have been a man extremely negligent in his person; and so careless in his dress, that he might have passed for a beggar rather than for what he was. He was actually seized one morning by the *archers des pauvres*, or parish-officers; which mistake was so far from provoking him, that he was highly diverted with it, and told them, that "he was not able to walk on foot, but that as soon as a new wheel was put to his chariot, he would attend them wherever they thought proper." He used to study and write by candle-light, even at noonday in summer; and, as if there had been no sun in the world, always waited upon his company to the door with a candle in his hand. With regard to religion, he affected Pyrrhonism; which however was not, it seems, so much in his heart as in his mouth. This appeared from his last sickness; for, having sent for those friends who had been the most usual witnesses of his licentious talk about religion, he made a sort of recantation, which he concluded with desiring them "to forget what he might formerly have said upon the subject of religion, and to remember, that Mezeray dying was a better believer than Mezeray in health." Besides his history, he also wrote, 1. A continuation of the history of the Turks. 2. A French translation of John de Sarisbury's Latin treatise on the vanities of the court. 3. There are attributed to him several satires against the government; and in particular, those that bear the name of Sandricourt.

MEZEREON, or MEZEREUM, in botany See DAPHNE.

MEZEREON. Spurge olive. Widow-wail. This plant, the Daphne mezereum of Linnéus, Daphne floribus sessilibus ternis caulinis, foliis lanceolatis deciduis, is extremely acrid, especially when fresh, and if retained in the mouth, excites great and long continued heat and inflammation, particularly of the mouth and fauces: the berries also have the same effects, and when swallowed, prove a powerful corrosive poison, not only to man, but to dogs, wolves, and foxes. The bark of the root is the part employed medicinally in the decoctum sarsaparillæ compositum, to assist mercury in resolving nodes and other obstinate symptoms of siphilis. The antisiphilitic virtues of mezereum, however, have been by many writers very justly doubted. "The result of my own experience (says Mr. Pearson of the Lock Hospital), by no means accords with the representation given of this root by former writers. From all that I have been able to collect, in the course of many years observation, I feel myself authorized to assert unequivocally, that the mezereum has not the power of curing the venereal disease in any one stage, or under any one form. If a decoction of this root should ever reduce a venereal node, where no mercury has been previously given, yet the patient will by no means be exempted from the necessity of employing mercury, for as long a space of time, and in as large a quantity, as if no mezereum had been taken. With respect to the power it is said to possess, of alleviating the pain, and diminishing the bulk of membranous nodes, nothing peculiar and appropriate can be ascribed to the mezereum on these accounts, since we obtain the same good effects from sarsaparilla, guaicum, volatile alkali, blistering plasters, &c. Nevertheless, venereal nodes which have subsided under the use of any of these articles of the materia medica, will appear again, and often with additional symptoms, if a full and efficacious course of mercury be not submitted to. It has indeed been alleged, that mezereum always alleviates the pain occasioned by a venereal node, and generally reduces it, where the periosteum only is affected; and that it seldom fails of removing those enlargements of the periosteum which have not yielded during the administration of mercury.

"That some instances of success, in cases like these, may have fallen to the share of those who made the assertion, it would not become me to deny; but I have met with few such agreeable evidences of the efficacy of this medicine. I have given the mezereum in the form of a simple decoction, and also as an ingredient in compound decoctions of the woods, in many cases, where no mercury had been previously employed, but never with advantage to a single patient. I have also tried it in numerous instances, after the completion of a course of mercury; yet, with the exception of two cases, where the thickened state of the periosteum was removed during the exhibition of it, I never saw the least benefit derived from taking this medicine.

In a few cases of anomalous pains, which I supposed were derived from irregularities during a mercurial course, the mezereum was of service, after I had tried the common decoction of the woods without success; but even in this description of cases I have always found it a very uncertain remedy.

"I have made trial of this vegetable in a great number of scrophulous cases, where the membranes covering the bones were in a diseased state, and I am not sure that one single patient obtained any evident and material benefit from it.

"The late Dr. Cullen, whose reports may justly claim attention from all medical men, when treating of the mezereum, in his materia medica, says, 'I have frequently employed it in several cutaneous affections, and sometimes with success.' It were to have been wished, that the professor of medicine had specified what those diseases of the skin were, in which the mezereum was sometimes employed with success; for, if I except an instance of two of lepra, in which the decoction of this plant conferred a temporary benefit, I have very seldom found it possessed of any medicinal virtue, either in siphilis, or in the sequelæ of that disease, in scrophula, or in cutaneous affections. Indeed the mezereum is of so acrimonious a nature, often producing heat and other disagreeable sensations in the fauces, and on many occasions, disordering the primæ viæ, that I do not often subject my patients to the certain inconveniences which are connected with the primary effects of this medicine, as they are rarely compensated by any other important and useful qualities."

MEZIERES, a town of France, in the department of Ardennes and late province of Champagne, with a citadel, seated on the Meuse, 12 miles N.W. of Sedan, and 127 N.E. of Paris. Lon. 4. 48 E. Lat. 49. 46 N.

MEZIRIAC (Claude Gaspar Backet Sieur de), one of the most ingenious men of the 17th century, was born at Bresse, of an ancient and noble family. He was a good poet in French, Italian, and Latin; an excellent grammarian, a great Greek scholar, and an admirable critic. He was well versed in the controversies, both in philosophy and religion; and was deeply skilled in algebra and geometry, of which last he gave proof by publishing the six books of Diophantes, enriched with a very able Commentary and Notes. In his youth he spent a considerable time at Paris and at Rome: at which last place he wrote a small collection of Italian poems, in competition with Vaugelas, who was there at the same time: among which there are imitations of the most beautiful similies contained in the eight first books of the Æneid. He also translated Ovid's Epistles; a great part of which he illustrated with very curious commentaries of his own. While he was at Paris, they talked of making him preceptor to Louis XIII.: upon which he left the court in great haste, and afterwards declared that he had never felt so much pain upon any occasion of his life; for he seemed to have already upon his shoulders the important weight of the whole kingdom. He undertook the translation of all Plutarch's works, with notes; which he had brought nearly to a conclusion, when he died at Bourg, in Bresse, anno 1638, at 45 years of age. He left behind him several finished works that were not printed.

MEZUZOTH, in the Jewish customs, certain pieces of parchment which the Jews fix to the door-posts of their houses, taking that literally which Moses commands them, saying, "Thou shalt never forget the laws of thy God, but thou shalt write them upon the posts of thy house, and on thy gates." This expression means nothing else, but that thou shalt always remember them, whether thou comest into thy house or goest out.

MEZZA BRAVURA, in music, an expression used by the Italians to signify an air of moderate passion and execution.

Mezza voce. (Ital.) An expression signifying that the movement before which it is written is to be sung or played with a moderate strength of tone, and in a delicate, pleasing manner.

Mezzo. (Ital.) Half, middle, mean. This word is generally used in conjunction with some other: as *mezzo forte*, moderately loud; *mezzo piano*, rather soft. When written alone, and applied to the grand piano-forte, it denotes that the pedal is to be used, taking off one of the sets of strings.

Mezzo soprano. (Ital.) A treble voice of a moderate, or somewhat low scale.

MEZZOTINTO, a particular manner of representing figures on copper, so as to form prints in imitation of painting in Indian ink. (See Engraving.) The invention of this art has been usually attributed to prince Rupert. But baron Heinikin, a very judicious and accurate writer upon the subject of engraving, asserts, with great appearance of truth, that it was a lieutenant-colonel de Siegan, an officer in the service of the landgrave of Hesse, who first engraved in this manner; and that the print which he produced was a portrait of the princess Amelia Elizabeth of Hesse, engraved in the year 1643. Prince Rupert learned the secret from this gentleman, and brought it into England when he came over the second time with Charles II. Prince Rupert's print of an executioner holding a sword in one hand and a head in the other, a half length, from Spagnoletto, is dated 1658. This art has never been cultivated with success in any country but England.

The prince laid his grounds on the plate with a channelled roller; but one Sherwin, about the same time, laid his grounds with a half-round file, which was pressed down with a heavy piece of lead. Both these grounding tools have been laid aside for many years; and a hand-tool, resembling a shoemaker's cutting-board-knife, with a fine crenelling on the edge, was introduced by one Edial, a smith by trade, who afterwards became a mezzotinto painter.

It is very different from the common way of engraving. To perform it, they take a smooth,

or punch, the surface of the plate all over with a knife, or instrument made for the purpose, first one way, then the other, across, &c. till the surface of the plate be thus entirely furrowed with lines or furrows, close and as it were contiguous to each other; so that, if an impression was then taken from it, it would be one uniform blot or smut. This done, the design is drawn or marked on the same face; after which, they proceed with burnishers, scrapers, &c. to expunge and take out the dents or furrows, in all the parts where the lights of the piece are to be; and that more or less as the lights are to be stronger or fainter; leaving those parts black which are to represent the shadows or deepenings of the draught.

As it is much easier to scrape or burnish away parts of a dark ground corresponding with the outline of any design sketched upon it, than to form shades upon a light ground by an infinite number of hatches, strokes, and points, which must all terminate with exactness on the outline, as well as differ in their force and manner; the method of scraping, as it is called, in mezzotinto, consequently becomes much more easy and expeditious than any other method of engraving. The instruments used in this kind of engraving are cradles, scrapers, and burnishers.

In this engraving, the plate must be prepared and polished in the same manner as for other engraving; and afterwards divided equally by lines parallel to each other, and traced out with very soft chalk.—The distance of these lines should be about one-third of the length of the face of the cradle which is to be used, and these lines should be marked with capital letters, or strokes of the chalk. The cradle is then to be placed exactly betwixt the two first lines, and passed forwards in the same direction; being kept as steady as possible, and pressed upon with a moderate force. The same operation must be repeated with respect to all the other lines, till the instrument has thus passed over the whole surface of the plate.—Other lines must be then drawn from the extremities of the other two sides, in the same manner; which, intersecting the first at right angles, will with them form squares; and the same operation must be repeated with the cradle as in the case of the first. New lines must then be drawn diagonally, and the cradle passed betwixt them as before; and when the first diagonal operation is performed, the lines must be crossed at right angles as the former, and the cradles passed betwixt them in the same manner.—The plate having undergone the action of the cradle, according to the disposition of the first order of lines, a second set must be formed, having the same distances from each other as the first. But they must be so placed as to divide those already made into spaces one-third less than their whole extent; i. e. every one after the first on each side will take in one-third of that before it, *e. g.* beginning at A, of which the first third must be left out; a third of B will consequently be taken in, and so of the rest. These lines of the second order must be marked with small letters, or lesser strokes to distinguish them from the first: and the same treatment of the plate must be pursued with respect to them as was practised for the others. When this second operation is finished a third order of lines must be made; the first of which, *e. g.* in A, must omit two-thirds of it, and consequently take in two-thirds of B, &c. By these means, the original spaces will be exactly divided into equal thirds; and the cradle must be again employed betwixt these lines as before.—When the whole of this operation is finished, it is called *one turn*; but in order to produce a very dark and uniform ground, the plate must undergo the repetition of all these several operations for above twenty times; beginning to pass the cradle again betwixt the first lines, and proceeding in the same manner through all the rest. When the plate is prepared with a proper ground, the sketch must be chalked on it, by rubbing the paper on the backside with chalk. It is also proper to overtrace it afterwards with black lead or Indian ink. The scraping is then performed, by paring or cutting away the grain of the ground in various degrees; so that none of it is left in the original state except in the touches of the strongest shade. The general manner of proceeding is the same as drawing with white upon black paper. The masses of light are first begun with; and those parts which go off into light in their upper part, but are brown below; the reflections are then entered upon; after which the plate is blackened with a printer's blacking-ball made of felt, in order to discover the effect: and then the work is proceeded with; observing always to begin every part in the places where the strongest lights are to be.

The act of scraping mezzotintoes has been applied to the printing with a variety of colours, in order to produce the resemblance of paintings. The inventor of the method of doing this was J. C. Le Blon, a native of Frankfort, and pupil of Carlo Maratti, between the years 1720 and 1730. It was established by the inventor on this principle, that there are three primitive colours, of which all the rest may be composed by mixing them in various proportions; that any two of these colours being mixed together, preserve their original power, and only produce a third colour such as their compound must necessarily give; but if transparent colours be mixed, and three primitive kinds compounded together, they destroy each other, and produce black, or a tendency to it, in proportion to the equality or inequality of the mixture; and that if, therefore, these three colours be laid, either separately or upon each other, by three plates, engraved correspondently on these principles to the colouring of the design, the whole variety of teints necessary may be produced. The requisites, therefore, to the execution of any design in this method of printing are as follow: 1. To settle a plan of the colouring to be imitated; showing where the presence of each of the three simple colours is necessary, either in its pure state or combined with some other, to

produce the effect required; and to reduce this plan to a painted sketch of each, in which not only the proper outlines, but the degree of strength should be expressed. 2. To engrave three plates according to this plan, which may print each of the colours exactly in the places where, and proportion in which they are wanted. 3. To find three transparent substances proper for printing with these three primitive colours. The manner in which Mr. Le Blon prepared the plates was as follows: The three plates of copper were first well fitted with respect to size and figure to each other, and grounded in the same manner as those designed for mezzotinto prints; and the exact place and boundary of each of the three primitive colours, conformably to the design, were sketched out on three papers, answering in dimensions to the plate. These sketches were then chalked on the plates; and all the parts of each plate that were not to convey the colour to which it was appropriated to the print were entirely scraped away, as in forming the light of mezzotinto prints. The parts that were to convey the colours were then worked upon; and where the most light or diluted teints of the colour were to be, the grain in the ground was proportionably taken off; but where the full colour was required, it was left entire. In this regard was had, not only to the effects of the colour in its simple state, but to its combined operation, either in producing orange-colour, green, or purple, by its admixture with one alone; and likewise to its forming brown, grey, and shades of different degrees, by its co-operation with both the others. But though the greatest part of the engraving was performed in the mezzotinto manner, yet the graver was employed occasionally for strengthening the shades, and for correcting the outline where it required great accuracy and steadiness. It was found necessary sometimes to have two separate plates for printing the same colour, in order to produce a stronger effect: but the second plate, which was used to print upon the first, was intended only to glaze and soften the colours in particular parts that might require it. See ENGRAVING.

MIASMA. (from μιαινω, to pollute.) Miasms, as they relate to the diseases both of human and brute animals, are productive of some of the febrile kinds, and of them only, as in the case of contagion. They are generally floating in the atmosphere, but not observed to act except when a healthy animal approaches the sources whence they arise. The idea of contagion properly implies a matter arising from a body under disease; and that of miasma a matter arising from other substances, as from putrifying vegetables, &c. See SEPTON.

Dr. Cullen remarks, that the substances imbued with the effluvia from the bodies of the diseased may be called fomites; and that it is probable that contagions, as they arise from fomites, are more powerful than as they arise immediately from the human body. Further, that though the fomites are possessed of matter from the human body, yet this matter passing from the fomites is called miasma; which requires further to be distinguished from the miasmata arising from marshes, &c. by the epithets human and marsh miasmata.

On this subject of contagion and miasma Dr. Cullen's observations have their value, as being applicable to the theory of contagious diseases in brutes. He says, as fevers are so generally epidemic, it is probable that some matter floating in the atmosphere, and applied to the bodies of men, ought to be considered as the remote cause of fevers. Contagions have been supposed to be of great variety, and it is possible that they may be so; but that they truly are, does not appear clearly from any thing that we know at present. The number of genera and species of contagious diseases, of the class pyrexiæ, at present known, is not very great. They belong to the order of fevers, of exanthemata, or of profluvia. Whether there be any belonging to the order of phlegmasiæ is doubtful; and, though it should be supposed, it will not much increase the number of contagious pyrexiæ. Of the contagious exanthemata and profluvia, the number of species is nearly ascertained; and each of them is so far of a determined nature, that though they have now been observed and distinguished for many ages, and in many different parts of the earth, they have been always found to retain the same general character, and to differ only in circumstances, which may be imputed only to season, climate, and other external causes, or to the peculiar constitution of the several persons affected. It is therefore probable, that in each of these species the contagion is of one specific nature, and that the number of the contagious exanthemata, or profluvia, is hardly greater than the number of species taken notice of in his system of nosology. While the contagious exanthemata and profluvia are thus limited, it is probable that the contagions which produce the continued fevers are not many; nay, it is not evident that there are more than one common source of them. It is well known that the effluvia constantly arising from the living human body, if long retained in the same place, without being diffused in the atmosphere, acquire a singular virulence, and, in that state, applied to the bodies of men, become the cause of a fever which is very contagious. The late observations on jail and hospital fevers have fully proved the existence of such a cause; and it is sufficiently obvious that the same virulent matter may be produced in many other places. At the same time, the nature of the fevers arising renders it probable that the virulent state of human effluvia is the common cause of such fevers, as they differ only in a state of their symptoms, which may be imputed to the circumstances of season, climate, &c. concurring with the contagion, and modifying its force.

Miasmata arise from various sources, and are of different kinds; but we know little of their variety or of their several effects. We know with certainty only one species of miasma

which can be considered as the cause of fever; and, from the universality of this, it may be doubted if there be any other. The miasma, so universally the cause of fever, is that which arises from marshes or moist ground, acted upon by heat. So many observations have now been made with respect to this, in so many different regions of the earth, that there is neither any doubt of its being in general the cause of fevers, nor of its being very universally the cause of intermittent fevers in all their different forms. The similarity of the climate, season, and soil, in which intermittents arise, and the similarity of the diseases arising in different regions, concur in proving that there is one common cause of these diseases, and that this is the marsh miasma. What is the particular nature of this miasma we know not; nor do we certainly know whether or not it differs in kind: but it is probable that it does not, and that it differs only in the degree of its power, or perhaps in its quality, in a given space.

MICA. In mineralogy, a genus of the class earths, order argillaceous. Consisting of silica and alumina, with a small proportion of oxyd of iron, and generally a little magnesia and lime; glabrous, meagre, shining, spontaneously falling into glanular fragments, easily breaking into discoid fragments, lightish, parasitical; fusible before the blow-pipe into a white or coloured enamel. Nine species.

1. M. membranacea. Glimmer: Glist: Muscovy talc. Transparent, with large, parallel, elastic, easily separable plates. Found in Malabar, Siberia, Russia, Finland, France, and near Geneva, in large plates which are often substituted for glass; and consists of a great number of thin transparent laminæ adhering together; easily distinguished from gypsum speculare, or glaciale, from their great degree of flexibility; texture foliated; fragments flat; lustre metallic; very rough; often absorbs water; feels smooth, but not greasy; spec. grav. from 2,6546 to 2,9342:

contains silica	. .	50,00
alumina	. .	35,00
oxyd of iron	.	7,00
magnesia	. .	1,35
lime	. . .	1,33
		94,68
Undecided		,32
		100,

2. M. laminosa. Fissile, or semipellucid membranaceous mica. Transparent, coloured, with large, parallel, easily separable plates. Found principally in the granites of primæval mountains, generally smoke-colour or black, sometimes brown, gold, red or white, and very rarely concreted in masses resembling pieces of shale.

3. M. squamosa. Scaly mica. Somewhat opake, with less, scattered, incurved foliations; one variety, of a silvery colour; another of a golden. Found every where in granite and other stones, intermixed among their component parts, in almost innumerable hues and colours, but generally with a coppery, silvery, or gold metallic lustre.

4. M. undulata. Wavy mica. Fissile mica. One variety, with undulate gold foliations; another with flexuous brittle gold foliations. Found in the mines of Dalecarlia.

5. M. hemisphærica. Hemisphæric mica. With hemisphæric concentric foliations. Found in Finland, in the hamlet Kimito, constituting a component part of decaying rock, white, very shining, and resembling in bulk and figure the half of a split-pea.

6. M. striata. Striated mica, with the foliations radiating. Found in Saxony in stones cinereous or black, becoming whitish or yellowish in the fire, and approaching nearly to a hornblend.

7. M. crystallina. Crystal mica. In six-sided tubles. Found in the mines of Dalecarlia, in Salsburg and Zinnwalden; the tubles sometimes scattered, sometimes aggregate, in a stellate manner, or disposed in columns.

8. M. prismatica. Prismatic mica. Brown, in nine-sided prisms. Found in the mines of Saxony, near Schneeberg, in rock composed of quartz and feldspar, opake, a little shining within.

9. M. lepidolithus. Lepidolite: Lilalite. With scattered, flat, cohering, pale violet scales. Found in Moravia and Sudermania, mixed with granite in large amorphous masses, composed of thin plates which easily separate; colour of the mass violet-blue, of the thin plates silvery white; powder white, with a pale red tinge; before the blow-pipe it froths, and melts easily into a white semitransparent enamel, full of bubbles; dissolves in borax with effervescence, and communicates no colour to it.

MICAH, or, The book of MICAH, a canonical book of the Old Testament, written by the prophet Micah, who is the seventh of the twelve prophets. He is cited by Jeremiah, and prophesied in the days of Jotham, Ahaz, and Hezekiah. He censures the reigning vices of Jerusalem and Samaria, and denounces the judgments of God against both kingdoms. He likewise foretels the confusion of the enemies of the Jews, the coming of the Messiah, and the glorious success of his church.

MICE. The plural of *mouse*.

MICHA, a cape of Dalmatia, which advances into the gulf of Venice, near the town of Zara.

MICHAEL (St.), the most fertile and populous of the Azores or Western Islands. Its two principal harbours are Punta Guda and Villa Franca: the former is the capital of the island. Lon. 25. 42 W. Lat. 37. 47 N.

MICHAEL (St.), a borough in Cornwall, which has neither market nor fair, but sends two members to parliament. It is eight miles S.W. of St. Columb, and 249 W. by S. of London. Lon. 4. 52 W. Lat. 50. 23 N.

MICHAEL (St.), a town of France, in the department of Meuse, remarkable for its hospital, and the rich library of a late Benedictine

abbey. It is seated on the Meuse, 20 miles N.E. of Bar-le-Duc, and 165 E. of Paris. Lon. 5. 38 E. Lat. 48. 51 N.

MICHAEL (St.), a seaport of New Spain, in the province of Guatimala, seated on a small river, 180 miles S.E. of New Guatimala. Lon. 87. 45 W. Lat. 12. 25 N.

MICHAEL (St.), a town of Peru, in the province of Quito. It was the first Spanish colony in Peru, and is seated near the mouth of the Piura, 225 miles S. by W. of Quito. Lon. 80. 50 W. Lat. 5. 0 S.

MICHAEL DE IBARRA (St.), a town of Peru, in the province of Quito, 60 miles N.E. of Quito.

MICHAEL (Gulf of St.), to the E. of Panama, that part of the Pacific ocean which was first discovered by the Spaniards, after their march across the isthmus of Darien.

MICHAELIS (John David), a celebrated biblical critic, and author of many esteemed works, was the eldest son of Dr. Christian Benedict Michaelis, professor in the university of Halle in Lower Saxony, and was born at that place Feb. 27, 1717. His father devoted him at an early age to an academical life; and with that view he received the first part of his education in a celebrated Prussian seminary, called the Orphan-house, at Glanche, in the neighbourhood of his native place. He commenced his academical career at Halle in 1733, and took his master's degree in the faculty of philosophy in 1739. In 1741 he made an excursion to this country, where his superior knowledge of the oriental languages, which was considerably increased by his indefatigable researches in the Bodleian library at Oxford, introduced him to the acquaintance, and gained him the esteem, of our first literary characters; with several of whom, and particularly bishop Lowth, he was in correspondence for many years. On his return to Halle, after an absence of fifteen months, he began to read lectures on the historical books of the Old Testament, which he continued after his removal to Gottingen in 1745. In 1746 he was appointed professor extraordinary, and soon after professor of philosophy in that university. The next year he obtained a place as secretary to the royal society there, of which he was director in 1761, and was soon afterwards made Aulic counsellor by the court of Hanover. In 1764, his distinguished talents, but chiefly a publication relative to a journey to Arabia, which was undertaken by several literary men, at the expence of the king of Denmark, in consequence of his application by means of count Bernsdorff, procured him the honour of being chosen a correspondent, and afterwards foreign member of the academy of inscriptions at Paris, of whom the institution admitted only eight; and in the same year he became a member of the society of Haarlem. In 1775, count Hopkin, who eighteen years before had prohibited the use of his writings at Upsal, when he was chancellor of that university, prevailed upon the king of Sweden to confer on him the order of the polar star, as a national compensation. In 1786 he was raised to the distinguished rank of privy counsellor of justice by the court of Hanover; and in 1788 received his last literary honour, by being unanimously elected a fellow of the royal society of London. His great critical knowledge of the Hebrew language, which he displayed in a new translation of the Bible, and in other works, raised him to a degree of eminence almost unknown before in Germany; and his indefatigable labours were only equalled by his desire of communicating the knowledge he acquired to the numerous students of all countries who frequented his admirable lectures; which he continued to deliver on various parts of the sacred writings in half-yearly courses, and on the Hebrew, Arabic, and Syriac languages, to the last year of his life. He was professor in the university of Gottingen forty-five years, and, during that long period, he filled the chair with dignity, credit, and usefulness. He died October 22, 1791, aged 74. He is said to have left behind him several valuable MSS. Of the works that were published during his life-time, and which are very numerous, a catalogue, in the order of their publication, is given in the Gentleman's Magazine, for March 1792. Michaelis's Lectures on the New Testament have been admirably translated by Dr. Herbert Marsh, and enriched with many valuable notes.

MICHAELMAS, or Feast of St. Michael and all Angels, a festival of the Christian church, observed on the 29th of September.

MICHAELMAS DAISY. In botany. See ASTER.

MICHA'UXIA. In botany, a genus of the class octandria, order monogynia. Calyx sixteen-parted; corol wheel-shaped, eight-parted; nectary eight-valved, bearing the stamens; capsule eight-celled, many-seeded. One species; a native of the Levant, with herbaceous stem, and white pendulous flowers.

To MICHE. *v. n.* To be secret or covered; to lie hid (*Hanmer*).

MICHE'LIA. In botany, a genus of the class polyandria, order polygynia. Calyx three-leaved; petals fifteen; berries numerous, four-seeded. Two species: Indian trees, as follow:

1. M. champaca. Leaves lanceolate, with yellow and very fragrant flowers.

2. M. tsiampaca. Leaves lanceovate; with a fine silky down, and whitish flowers.

MICHELONIA, a country of Prussia, which is part of the circle of Culm, and separated from the other part by the river Dribents. It takes its name from the castle of Michelow.

MICHIGAN, a considerable lake of North America, whose N.E. extremity communicates with the N.W. end of Lake Huron by the strait of Michillimackinac.

MI'CHER. *s.* (from *miche.*) A lazy loiterer, who skulks about in corners and by-places; a hedge-creeper (*Sidney*).

MI'CKLE. *a.* (micel, Saxon.) Much; great; muckle (*Camden*).

MICKLE (William Julius), a Scotch poet,

born at Langholm in Dumfriesshire, in 1734. He was educated at the high school, Edinburgh, after which he became a weaver in that city. Not succeeding in that business, he came to England, and was for some time corrector at the Clarendon press, Oxford, where he produced several poems. His greatest work was his translation of the Lusiad, from the Portuguese of Camoens, 4to. Oxford, 1775. A second edition appeared in 1778, and procured the author more reputation than profit. In 1781 he went to Lisbon as secretary to governor Johnstone, and while there wrote his poem, entitled Almada Hill. The patronage of the governor rendered his circumstances comfortable, and on his return to England he entered into the marriage state. He died in 1789. His poems were published in 1794 in in one volume, 4to.

MICRANA. MIGRANA. Corruptions from hemicrania, or pain on one side of the head: and hence perhaps the vulgar term megraims, nervousness, low spirits.

MICROCA'RPON. In botany, a genus of the class cryptogamia, order fungi. Fungus with a membranous case opening irregularly, filled with seminiferous filaments reticulately compact and affixed to the base. One species: M. pallida; an exotic, and the cribraria of several foreign botanists.

MICROCOSM, a Greek term signifying the little world; used by some for man, as being supposed an epitome of the universe or great world.

MICROCO'SMIC BEZOAR. See CALCULUS.

MICROCOSMIC SALT, the compound phosphat of soda and ammonia. It is often used as a test in the analysis of metals.

MI'CROGRAPHY. *s.* (μικρ⊛ and γράφω.) The description of the parts of such very small objects as are discernible only with a microscope (*Grew*).

MI'CROMETER. *s.* (μίκρ⊛ and μετρον.) An instrument by the help of which the apparent magnitudes of objects viewed through telescopes or microscopes are measured with great exactness.

The general principle of this instrument is, that it moves a fine wire, parallel to itself, in the plane of the picture of an object, formed in the focus of a telescope, and thus measures its perpendicular distance from a fixed wire in the same plane.

This instrument was invented about the year 1666; and it has, of course, undergone many improvements since that time. Mr. Gascoigne divided the image of an object, in the focus of the object-glass, by the approach of two pieces of metal, ground to a very fine edge; instead of which, Dr. Hooke would substitute two fine hairs, stretched parallel to each other; and two other methods of Dr. Hooke, different from this, are described in his posthumous works, p. 497, &c. An account of several curious observations which Mr. Gascoigne made by the help of his micrometer, particularly in measuring the diameter of the moon and other planets, may be seen in the Phil. Trans. vol. 48, pa. 190; where Dr. Bevis refers to an original letter of Mr. Gascoigne to Mr. Oughtred, written in 1641, for an account given by the author of his own invention, &c.

Mons. De la Hire, in a discourse on the æra of the inventions of the micrometer, pendulum clock, and telescope, read before the Royal Academy of Sciences in 1717, makes M. Huygens the inventor of the micrometer. That author, he observes, in his Observations on Saturn's Ring, &c. published in 1659, gives a method of finding the diameters of the planets by means of a telescope, viz. by putting an object, which he calls a virgular, of a size proper to take in the distance to be measured, in the focus of the convex object-glass: in this case, says he, the smallest object will be seen very distinctly in that place of the glass. By such means, he adds, he measured the diameter of the planets, as he there delivers them. See Huygens's System of Saturn.

This micrometer, M. De la Hire observes, is so very little different from that published by the marquis de Malvasia, in his Ephemerides, three years after, that they ought to be esteemed the same: and the micrometer of the marquis differed yet less from that published four years after his, by Azout and Picard. Hence, De la Hire concludes, that it is to Huygens the world is indebted for the invention of the micrometer; without taking any notice of the claim of our countryman Gascoigne, which, however, is many years prior to any of them.

De la Hire says, that there is no method more simple or commodious for observing the digits of an eclipse than a net in the focus of the telescope. These, he says, were usually made of silken threads; and for this particular purpose six concentric circles had also been used, drawn upon oiled paper; but he advises to draw the circles on very thin pieces of glass, with the point of a diamond. He also gives some particular directions to assist persons in using them. In another memoir he shews a method of making use of the same net for all eclipses, by using a telescope with two object-glasses, and placing them at different distances from each other. Mem. 1701 and 1717.

M. Cassini invented a very ingenious method of ascertaining the right ascensions and declinations of stars, by fixing four cross hairs in the focus of the telescope, and turning it about its axis, so as to make them move in a line parallel to one of them. But the later improved micrometers will answer this purpose with greater exactness. Dr. Maskelyne has published directions for the use of it, extracted from Dr. Bradley's papers, in the Philos. Trans. vol. 62. See also Smith's Optics, vol. 2, pa. 343.

Wolfius describes a micrometer of a very easy and simple structure, first contrived by Kirchius.

Dr. Derham tells us, that his micrometer is not put into a tube, as is usual, but is contrived to measure the spectres of the sun on paper, of any radius, or to measure any part of them. By this means he can easily, and very exactly, with the help of a fine thread, take the declination of a solar spot at any time of the day; and, by his half-seconds watch, measure the distance of the spot from either limb of the sun.

J. And. Segner proposed to enlarge the field of view in these micrometers, by making them of a considerable extent, and having a moveable eye-glass, or several eye-glasses, placed opposite to different parts of it. He thought, however, that two would be quite sufficient, and he gives parti-

-cular directions how to make use of such micrometers in astronomical observations. See Comm. Gotting. vol. 1, pa. 27.

A considerable improvement in the micrometer was communicated to the Royal Society, in 1743, by Mr. S. Savary; an account of which, extracted from the minutes by Mr. Short, was published in the Philos. Trans. for 1753. The first hint of such a micrometer was suggested by M. Roemer, in 1675: and M. Bouguer proposed a construction similar to that of M. Savary, in 1748; for which see HELIOMETER. The late Mr. Dollond made a farther improvement in this kind of micrometer, an account of which was given to the Royal Society by Mr. Short, and published in the Philos. Trans. vol. 48. Instead of two object-glasses, he used only one, which he neatly cut into two semicircles, and fitted each semicircle into a metal frame, so that their diameters sliding in one another, by means of a screw, may have their centres so brought together as to appear like one glass, and so form one image; or by their centres receding, may form two images of the same object: it being a property of such glasses, for any segment to exhibit a perfect image of an object, although not so bright as the whole glass would give it. If proper scales are fitted to this instrument, shewing how far the centres recede, relative to the focal length of the glass, they will also shew how far the two parts of the same object are asunder, relative to its distance from the object glass; and consequently give the angle under which the distance of the parts of that object are seen. This divided object glass micrometer, which was applied by the late Mr. Dollond to the object end of a reflecting telescope, and has been with equal advantage adapted by his son to the end of an achromatic telescope, is of so easy use, and affords so large a scale, that it is generally looked upon by astronomers as the most convenient and exact instrument for measuring small distances in the heavens. However, the common micrometer is peculiarly adapted for measuring differences of right ascension and declination of celestial objects, but less convenient and exact for measuring their absolute distances; whereas the object-glass micrometer is peculiarly fitted for measuring distances, though generally supposed improper for the former purpose. But Dr. Maskelyne has found that this may be applied with very little trouble to that purpose also; and he has furnished the directions necessary to be followed when it is used in this manner. The addition requisite for this purpose is a cell, containing two wires, intersecting each other at right angles, placed in the focus of the eye-glass of the telescope, and moveable round about, by the turning of a button. For the description of this apparatus, with the method of applying and using it, see Dr. Maskelyne's paper on the subject, in the Philos. Trans. vol. 61, pa. 536, &c.

After all, the use of the object-glass micrometer is attended with difficulties, arising from the alterations in the focus of the eye, which are apt to cause it to give different measures of the same angle at different times. To obviate these difficulties, Dr. Maskelyne, in 1776, contrived a prismatic micrometer, or a micrometer consisting of two achromatic prisms, or wedges, applied between the object-glass and eye-glass of an achromatic telescope, by moving of which wedges nearer to or farther from the object-glass, the two images of an object produced by them appeared to approach to, or recede from, each other, so that the focal length of the object-glass becomes a scale for measuring the angular distance of the two images. The rationale and use of this micrometer are explained in the Philos. Trans. vol. 67, pa. 799, &c. And a similar invention by the abbé Rochon, and improved by the abbé Boscovich, was also communicated to the Royal Society, and published in the same volume of the Transactions, pa. 789, &c.

Mr. Ramsden has lately described two new micrometers, which he has contrived for remedying the defects of the object-glass micrometer. One of these is a catoptric micrometer, which, besides the advantage it derives from the principle of reflection, of not being disturbed by the heterogeneity of light, avoids every defect of other micrometers, and can have no aberration, nor any defect arising from the imperfection of materials, or of execution; as the great simplicity of its construction requires no additional mirrors or glasses, to those required for the telescope; and the separation of the image being effected by the inclination of the two specula, and not depending on the focus of lens or mirror, any alteration in the eye of an observer cannot affect the angle measured. It has peculiar to itself the advantages of an adjustment, to make the images coincide in a direction perpendicular to that of their motion; and also of measuring the diameter of a planet on both sides of the zero; which will appear no inconsiderable advantage to observers who know how much easier it is to ascertain the contact of the external edges of two images than their perfect coincidence.

The other micrometer invented and described by Mr. Ramsden, is suited to the principle of refraction. This micrometer is applied to the erect eye-tube of a refracting telescope, and is placed in the conjugate focus of the first eye-glass, as the image is considerably magnified before it comes to the micrometer, any imperfection in its glass will be magnified only by the remaining eye-glasses, which in any telescope seldom exceeds five or six times; and besides, the size of the micrometer glass will not be the one hundredth part of the area which would be required, if it were placed at the object-glass; and yet the same extent of scale is preserved, and the images are uniformly bright in every part of the field of the telescope. See the description and construction of these two micrometers in the Philos. Trans. vol. 69, part 2, art. 27.

In vol. 72 of the Philos. Trans. for the year 1782, Dr. Herschel, after explaining the defects and imperfections of the parallel-wire micrometer, especially for measuring the apparent diameter of stars, and the distances between double and multiple stars, describes one for these purposes, which he calls a lamp micrometer; one that is free from such defects, and has the advantage of a very enlarged scale. In speaking of the application of this instrument, he says, "It is well known to opticians and others, who have been in the habit of using optical instruments, that we can with one eye look into a microscope or telescope, and see an object much magnified, while the naked eye may see a scale upon which the magnified picture is thrown. In this manner I have generally determined the power of my telescopes; and any one who has acquired a facility of taking such observations will very seldom mistake so much as one in fifty in determining the power of an instrument, and that degree of exactness is fully sufficient for the purpose.

"The Newtonian form is admirably adapted to the use of this micrometer; for the observer stands

always erect, and looks in a horizontal direction, notwithstanding the telescope should be elevated to the zenith.—The scale of the micrometer at the convenient distance of ten feet from the eye, with the power of four hundred and sixty, is above a quarter of an inch to a second; and by putting on my power of nine hundred and thirty-two, I obtain a scale of more than half an inch to a second, without increasing the distance of the micrometer; whereas the most perfect of my former micrometers, with the same instrument, had a scale of less than the two hundredth part of an inch to a second.

"The measures of this micrometer are not confined to double stars only, but may be applied to any other objects that require the utmost accuracy, such as the diameters of the planets or their satellites, the mountains of the moon, the diameters of the fixed stars, &c."

We shall now give an account of a micrometer by Mr. Troughton, which is applied to the eye-piece of a telescope to measure exceedingly small angles, as the diameter of the heavenly bodies, &c. Plate 103, fig. 6, is an orthography projecting endways; fig. 7, a section of the box containing the wires; and fig. 8, a section lengthways: the same letters, as far as they can, are used in all the figures. Figs. 6 and 8, A is an eye-tube containing a convex lens at each end, this slides in another tube, *dd*, so as to adjust the glass to distinct vision of the wires, the tube, *dd*, is screwed into another, *bb*, which is much larger, through this a thin long box, D D D, containing the wire slides. The micrometer is screwed to the telescope by a male screw, *e e*, (fig 8.) in the same piece with which is a circular plate, *ff*, cut all round with fine teeth, this plate fits against the flat bottom of the box, *b*, and turns round concentrically with it by means of a ring, *k*, fitting into a conical hole in the centre of the plate, *ff*, and screwed to the box; a small endless screw, *h*, (fig. 6.) turning in two brass collars screwed to the box, *b*, works in the teeth cut round the plate, *f*, and by that means when the milled head on the arbor of the endless screw is turned, it turns the eye-tube and box, D D, round, to bring it to any convenient position for measuring the angles required; the box containing the wires is shewn open in fig. 7, it containing two frames, *hhh*, and *llll*, one sliding within another, which moves in the box, without lateral shake, yet fitted so as, to slide easily backwards and forwards in the box, by the screws, *m* and *n*, in the same manner as the microscope in the upper part of the same plate; *o* and *p* are springs to counteract the screws and make the motion pleasant. A wire is stretched across the frame, *h h*, at right angles to its sides, and another of the same size is fixed across the slider, *l l l*, exactly parallel to the former; a small quantity of the underside of the latter is cut away, and its wire is fixed in another plane to the wire of *h h h*, so that the wires can pass each other without touching, but as near as possible; when they are placed by their screws over each other, and viewed through the eye-tube, they appear but as one wire: the divided circle, *x*, on the nuts of screws are then slipped round, without the screw, to bring the first division on them to the index *l*; the instrument is now adjusted for observing any angle, it is screwed to the telescope, and by the endless screw, *h*, (fig. 6.) the micrometer is turned round so as to bring a fixed wire, *w*, which is perpendicular to the others, to cover the two objects; the two wires are then separated by turning either of the nuts, F, until the wires include the angle to be measured: the whole box (fig. 7.) of the micrometer slides through the tube, in the direction of its length, to follow any moving object. When the observation is completed, it is read off by a scale of notches in the box, (fig. 7.) determining the number of revolutions the screw has made, and the divisions pointed out on the circles, *x*; by the indexes, *l l*, the number of aliquot parts is denoted; the circular plate, *ff*, is divided into degrees as shewn in fig. 6, and it is by this that the angle line measured makes with the horizon is registered

The circles are divided in one hundred parts, and have no determinate value in angular measurement, but their value is determined experimentally by observing through the telescope; it is applied to the diameter of the sun, or any other body whose angular measure has been previously and accurately determined by some other divided instrument, and from this the angle given by each observation is calculated.

The micrometer has not only been applied to telescopes, and employed for astronomical purposes; but there have been various contrivances for adapting it to microscopical observations. M. Leeuwenhoek's method of estimating the size of small objects, was by comparing them with grains of sand, of which one hundred in a line took up an inch. These grains he laid upon the same plate with his objects, and viewed them at the same time. Dr. Jurin's method was similar to this; for he found the diameter of a piece of fine silver wire, by wrapping it very close upon a pin, and observing how many rings made an inch: and he used the wire in the same manner as Leeuwenhoek used his sand Dr. Hooke used to look upon the magnified object with one eye, while, at the same time, he viewed other objects at the same distance, with the other eye. In this manner he was able, by the help of a ruler, divided into inches and small parts, and laid on the pedestal of the microscope, as it were to cast the magnified appearance of the object upon the ruler, and thus exactly to measure the diameter which it appeared to have through the glass; which being compared with the diameter as it appeared to the naked eye, easily shewed the degree in which it was magnified. A little practice, says Mr. Baker, will render this method exceedingly easy and pleasant.

Mr. Martin, in his Optics, recommends such a micrometer for a microscope as had been applied to telescopes; for he advises to draw a number of parallel lines on a piece of glass, with the fine point of a diamond, at the distance of one-fortieth of an inch from one another, and to place it in the focus of the eye-glass. By this method Dr. Smith contrived to take the exact draught of objects viewed by a double microscope; for he advises to get a lattice, made with small silver wires or squares, drawn upon a plain glass by the strokes of a diamond, and to put it into the place of the image formed by the object-glass. Then, by transferring the parts of the object seen in the squares of the glass or lattice, upon similar corresponding squares drawn on paper, the picture may be exactly taken.

Mr. Martin also introduced into compound microscopes another micrometer, consisting of a screw.

A very accurate division of a scale is performed by Mr. Coventry of Southwark. The micrometers of his construction are parallel lines drawn on glass, ivory, or metal, from the tenth to the ten-thousandth part of an inch. These may be applied

to microscopes for measuring the size of minute objects, and the magnifying power of the glasses; and to telescopes for measuring the size and distance of objects, and the magnifying power of the instrument. To measure the size of an object in a single microscope, lay it on a micrometer whose lines are seen magnified in the same proportion with it, and they give, at one view, the real size of the object. For measuring the magnifying power of the compound microscope, the best and readiest method is the following: On the stage, in the focus of the object-glass, lay a micrometer, consisting of an inch divided into one hundred equal parts, count how many divisions of the micrometer are taken into the field of view; then lay a two-foot rule parallel to the micrometer; fix one eye on the edge of the field of light, and the other eye on the end of the rule, which move till the edge of the field of light and the end of the rule correspond; then the distance from the end of the rule to the middle of the stage will be half the diameter of the field. *Ex. gr.* If the distance be ten inches the whole diameter will be twenty, and the number of the divisions of the micrometer contained in the diameter of the field is the magnifying power of the microscope.

Mr. Adams has applied a micrometer that instantly shews the magnifying power of any telescope.

In the Philosophical Transactions for 1791, a very simple micrometer for measuring small angles with the telescope is described by Mr. Cavallo, who introduces his description with the following observations upon the different sorts of telescopical micrometers in use: "These instruments may be divided into two classes; namely, those which have not, and those which have, some movement amongst their parts. The micrometers of the former sort consist mostly of fine wires or hairs, variously disposed, and situated within the telescope, just where the image of the object is formed. In order to determine an angle with those micrometers, a good deal of calculation is generally required. The micrometers of the other sort of which there is a great variety, some being made with moveable parallel wires, others with prisms, others again with a combination of lenses, and so on, are more or less subject to several inconveniences, the principal of which are the following: 1. Their motions generally depend upon the action of a screw; and of course the imperfections of its threads, and the greater or less quantity of lost motion, which is observable in moving a screw, especially when small, occasion a considerable error in the mensuration of angles. 2. Their complication and bulk render them difficultly applicable to a variety of telescopes, especially to the pocket ones. 3. They do not measure the angle without some loss of time, which is necessary to turn the screw, or to move some other mechanism. 4. and lastly, They are considerably expensive, so that some of them cost even more than a tolerably good telescope."

After having had long in view (our author informs us) the construction of a micrometer which might be in part at least, if not entirely, free from all those objections; he, after various attempts, at last succeeded with a simple contrivance, which, after repeated trials, has been found to answer the desired end, not only from his own experience, but from that also of several friends to whom it has been communicated.

This micrometer, in short, consists of a thin and narrow slip of mother-of-pearl finely divided, and situated in the focus of the eye-glass of a telescope, just where the image of the object is formed. It is immaterial whether the telescope be a refractor or a reflector, provided the eye-glass be a convex lens, and not a concave one, as in the Galilean construction.

The simplest way of fixing it is to stick it upon the diaphragm, which generally stands within the tube and in the focus of the eye-glass. When thus fixed, if you look through the eye-glass, the divisions of the micrometrical scale will appear very distinct, unless the diaphragm is not exactly in the focus; in which case, the micrometrical scale must be placed exactly in the focus of the eye-glass, either by pushing the diaphragm backwards or forwards, when that is practicable; or else the scale may be easily removed from one or the other surface of the diaphragm by the interposition of a circular piece of paper or card, or by a bit of wax. This construction is fully sufficient, when the telescope is always to be used by the same person; but when different persons are to use it, then the diaphragm which supports the micrometer must be constructed so as to be easily moved backwards or forwards, though that motion needs not be greater than about a tenth or an eighth of an inch. This is necessary, because the distance of the focus of the same lens appears different to the eyes of different persons; and, therefore, whoever is going to use the telescope for the mensuration of any angle, must first of all unscrew the tube which contains the eye-glass and micrometer from the rest of the telescope, and, looking through the eye-glass, must place the micrometer where the divisions of it may appear quite distinct to his eye.

In case any person should not like to see always the micrometer in the field of the telescope, then the micrometrical scale, instead of being fixed to the diaphragm, may be fitted to a circular perforated plate of brass, wood, or even paper, which may be occasionally placed upon the said diaphragm.

Mr. Cavallo has made several experiments to determine the most useful substance for this micrometer.—Glass, which he had successfully applied for a similar purpose to the compound microscope, seemed at first to be the most promising; but it was at last rejected after several trials: for the divisions upon it generally are either too fine to be perceived, or too rough; and though with proper care and attention the divisions may be proportioned to the sight, yet the thickness of the glass itself obstructs in some measure the distinct view of the object. Ivory, horn, and wood, were found useless for the construction of this micrometer, on account of their bending, swelling, and contracting very easily; whereas mother-of-pearl is a very steady substance, the divisions upon it may be marked very easily, and when it is made as thin as common writing-paper it has a very useful degree of transparency.

Fig. 5. exhibits this micrometer scale, but shows it four times larger than the real size of one, which he has adapted to a three-feet achromatic telescope, that magnifies about 84 times. It is something less than the 24th part of an inch broad; its thickness is equal to that of common writing-paper; and the length of it is determined by the aperture of the diaphragm, which limits the field of the telescope. The divisions upon it are the 200ths of an inch, which reach from one edge of the scale to about the middle of it, excepting

every fifth and tenth division, which are longer. The divided edge of it passes through the centre of the field of view, though this is not a necessary precaution in the construction of this micrometer. Two divisions of the above described scale in my telescope are very nearly equal to one minute; and as a quarter of one of those divisions may be very well distinguished by estimation, therefore an angle of one eighth part of a minute, or of $7''\frac{1}{2}$, may be measured with it.

"When a telescope magnifies more, the divisions of the micrometer must be more minute; and Mr. Cavallo finds, that when the focus of the eye-glass of the telescope is shorter than half an inch, the micrometer may be divided with the 500th of an inch; by means of which, and the telescope magnifying about 200 times, one may easily and accurately measure an angle smaller than half a second. On the other hand, when the telescope does not magnify above 30 times, the divisions need not be so minute: for instance, in one of Dollond's pocket telescopes, which when drawn out for use is about 14 inches long, a micrometer with the hundredths of an inch is quite sufficient, and one of its divisions is equal to little else than three minutes, so that an angle of a minute may be measured by it.

"In looking through a telescope furnished with such a micrometer (says our author), the field of view appears divided by the micrometer scale, the breadth of which occupies about one-seventh part of the aperture; and as the scale is semitransparent, that part of the object which happens to be behind it may be discerned sufficiently well to ascertain the division, and even the quarter of a division with which the borders coincide. Fig. 9. shows the appearance of the field of my telescope with the micrometer, when directed to the title-page of the Philosophical Transactions, wherein one may observe that the thickness of the letter C is equal to three-fourths of a division, the diameter of the O is equal to three divisions, and so on.

"At first view, one is apt to imagine that it is difficult to count the divisions which may happen to cover or to measure an object; but, upon trial, it will be found that this is readily performed; and even people who have never been used to observe with the telescope, soon learn to measure very quickly and accurately with this micrometer; for, since every fifth and tenth division is longer than the rest, one soon acquires the habit of saying, five, ten, fifteen; and then, adding the other divisions less than five completes the reckoning. Even with a telescope which has no stand, if the object end of it be rested against a steady place, and the other end be held by the hand near the eye of the observer, an object may be measured with accuracy sufficient for several purposes, as for the estimation of small distances, for determining the height of a house, &c.

"After having constructed and adapted this micrometer to the telescope, it is then necessary to ascertain the value of the divisions. It is hardly necessary to mention, in this place, that though those divisions measure the chords of the angles, and not the angles or arches themselves, and the chords are not as the arches, yet it has been shown, by all the trigonometrical writers, that, in small angles, the chords, arches, sines and tangents follow the same proportion so very nearly that the very minute difference may be safely neglected: so that if one division of this micrometer is equal to one minute, we may safely conclude, that two divisions are equal to two minutes, three divisions to three minutes, and so on. There are various methods of ascertaining the value of the divisions of such a micrometer, they being the very same that are used for ascertaining the value of the divisions in other micrometers. Such are, the passage of an equatorial star over a certain number of divisions in a certain time; or the measuring of the diameter of the sun, by computation from the focal distance of the object, and other lenses of the telescope; the last of which however is subject to several inaccuracies: but as they are well known to astronomical persons, and have been described in many books, they need not be further noticed here. However, for the sake of workmen and other persons not conversant in astronomy, I shall describe an easy and accurate method of ascertaining the value of the divisions of the micrometer.

"Mark upon a wall or other place the length of six inches, which may be done by making two dots or lines six inches asunder, or by fixing a six-inch ruler upon a stand, then place the telescope before it, so that the ruler or six-inch length may be at right angles with the direction of the telescope, and just 57 feet $3\frac{1}{2}$ inches distant from the object-glass of the telescope: this done, look through the telescope at the ruler or other extension of six inches, and observe how many divisions of the micrometer are equal to it, and that same number of divisions is equal to half a degree, or thirty minutes; and this is all that needs be done for the required determination; the reason of which is, because an extension of six inches subtends an angle of $30'$ at the distance of 57 feet $3\frac{1}{2}$ inches, as may be easily calculated by the rules of plane trigonometry.

"In one of Dollond's 14-inch pocket telescopes, if the divisions of the micrometer be the hundredths of an inch, $11\frac{1}{2}$ of those divisions will be found equal to $30'$, or 23 to a degree. When this value has been once ascertained, any other angle measured by any other number of divisions is determined by the rule of three. Thus, suppose that the diameter of the sun seen through the same telescope be found equal to 12 divisions, say as $11\frac{1}{2}$ divisions are to 30 minutes, so are 12 divisions to $\left(\frac{12' \times 30'}{11.5}\right)$ 31.3, which is the required diameter of the sun.

"Notwithstanding the facility of this calculation, a scale may be made answering to the divisions of a micrometer, which will shew the angle corresponding to any number of divisions to mere inspection." Thus, for the above-mentioned small telescope, the scale is represented in fig. 10. AB is the line drawn at pleasure; it is then divided into 23 equal parts, and those divisions which represent the divisions of the micrometer that are equal to one degree, are marked on one side of it. The line then is divided again into 60 equal parts, which are marked on the other side of it; and these divisions represent the minutes which correspond to the divisions of the micrometer: thus the figure shews that six divisions of the micrometer are equal to $15\frac{1}{2}$ minutes, $11\frac{1}{2}$ divisions are nearly equal to 29 minutes, &c. What has been said of minutes may be said of seconds also, when the scale is to be applied to a large telescope.

"Thus far this micrometer and its general use have been sufficiently described; and mathematical persons may easily apply it to the various

purposes to which micrometers have been found subservient. But as the simplicity, cheapness, and at the same time the accuracy of this contrivance, may render the use of it much more general than that of any other micrometer; and I may venture to say, that it will be found very useful in the army, and amongst sea-faring people, for the determination of distances, heights, &c.; I shall therefore join some practical rules to render this micrometer useful to persons unacquainted with trigonometry and the use of logarithms.

"Problem I. The angle, not exceeding one degree, which is subtended by an extension of one foot, being given, to find its distance from the place of observation. *N. B.* This extension of one foot, or any other which may be mentioned hereafter, must be perpendicular to the direction of the telescope through which it is observed. The distances are reckoned from the object glass of the telescope; and the answers obtained by the rules of this problem, though not exactly true, are however so little different from the truth, that the difference seldom amounts to more than two or three inches, which may be safely neglected.

"Rule 1. If the angles be expressed in minutes, say, As the given angle is to 60, so is 687.55 to a fourth proportional, which gives the answer in inches.—2. If the angle be expressed in seconds, say, As the given angle is to 3600, so is 687.55 to a fourth proportional, which expresses the answer in inches.—3. If the angle be expressed in minutes and seconds, turn it all into seconds, and proceed as above.

"Example. At what distance is a globe of one foot in diameter when it subtends an angle of two seconds?

$$2 : 3600 : : 687.55 : \frac{3600 \times 687.55}{2} = 1238590$$

inches, or $103132\frac{1}{2}$ feet, which is the answer required.

"This calculation may be shortened; for, since two of the three proportionals are fixed, their product in the first case is 41253, and in the other two cases is 2475180; so that in the first case, viz. when the angle is expressed in minutes, you need only divide 41253 by the given angle; and in the other two cases, viz. when the angle is expressed in seconds, divide 2475180 by the given angle, and the quotient in either case is the answer in inches.

"Problem II. The angle, not exceeding one degree, which is subtended by any known extension, being given, to find its distance from the place of observation.

"Rule. Proceed as if the extension were of one foot by problem I. and call the answer B; then, if the extension in question be expressed in inches, say, As 12 inches are to that extension, so is B to a fourth proportional, which is the answer in inches; but if the extension in motion be expressed in feet, then you need only multiply it by B, and the product is the answer in inches.

"Example. At what distance is a man six feet high, when he appears to subtend an angle of 30"?

"By problem 1. if the man were one foot high, the distance would be 82506 inches; but as he is six feet high, therefore multiply 82506 by 6, and the product gives the required distance, which is 495036 inches, or 41253 feet.

"For greater conveniency, especially in travelling, or in such circumstances in which one has not the opportunity of making even the easy calculations required in those problems, I have calculated the following two tables; the first of which shows the distance answering to any angle from one minute to one degree, which is subtended by an extension of one foot; and the second table shows the distance answering to any angle from one minute to one degree, which is subtended by a man, the height of which has been called an extension of six feet; because, at a mean, such is the height of a man when dressed with hat and shoes on. These tables may be transcribed on a card, and may be had always ready with a pocket telescope furnished with a micrometer. Their use is evidently to ascertain distances without any calculation; and they are calculated only to minutes, because with a pocket telescope and micrometer it is not possible to measure an angle more accurately than to a minute.

"Thus, if one wants to measure the extension of a street, let a foot ruler be placed at the end of the street; measure the angular appearance of it, which suppose to be 36 minutes, and in the table you will have the required distance against 36 minutes, which is $95\frac{1}{2}$ feet. Thus also a man who appears to be 49 minutes high, is at the distance of 421 feet.

Angles subtended by an extension of one foot at different distances.

Angles.	Distances in feet.	Angles.	Distances in feet.
Min. 1	3437,7	Min. 31	110,9
2	1718,9	32	107,4
3	1145,9	33	104,2
4	859,4	34	101 1
5	687,5	35	98.2
6	572,9	36	95,5
7	491,1	37	92,9
8	429,7	38	90 4
9	382,0	39	88,[illegible]
10	343,7	40	8[illegible]
11	312,5	41	83,8
12	286,5	42	81,8
13	264,4	43	79,9
14	245,5	44	78,1
15	229,2	45	76,4
16	214 8	46	74,7
17	202,2	47	73,1
18	191,0	48	71,6
19	180,9	49	70,1
20	171,8	50	68,7
21	162,7	51	67,4
22	156,2	52	66,1
23	149,4	53	64,8
24	143,2	54	63,6
25	137,5	55	62.5
26	132.2	56	61,4
27	127,3	57	60,3
28	122,7	58	59,2
29	118,5	59	58,2
30	114,6	60	57,3

Angles subtended by an extension of six feet at different distances.

Angles.	Distances in feet.	Angles.	Distances in feet.
Min. 1	20626,8	Min. 31	665,4
2	10313.	32	644,5
3	6875,4	33	625.
4	5156,5	34	606,6
5	4125,2	35	589,3
6	3437,7	36	572,9
7	2946,6	37	557,5
8	2578,2	38	542,8
9	2291,8	39	528,9
10	2062,6	40	515,6
11	1875,2	41	503,1
12	1718,8	42	491,1
13	1586,7	43	479,7
14	1473,3	44	468,8
15	1375.	45	458,4
16	1298,1	46	448,4
17	1213,3	47	438,9
18	1145,9	48	429,7
19	1085,6	49	421.
20	1031,4	50	412,5
21	982,2	51	404,4
22	937,6	52	396,7
23	896,8	53	389,2
24	859,4	54	381,9
25	825.	55	375.
26	793,3	56	368,3
27	763,9	57	361,9
28	736,6	58	355,6
29	711,3	59	349,6
30	687,5	60	343,7

Mr. Cavallo's micrometer cannot be used in reflecting telescopes, nor in any achromatic telescopes where the adjustment of the eye-piece is effected by rack-work, unless the structure of these instruments is altered for the purpose. And again as the micrometer passes through the centre of the field, the view is rendered unpleasant by the field being divided in two unequal segments; to which may be added, that the different divisions of the micrometer are at unequal distances from the eye-glass, they neither appear equally distinct, nor subtend equal angles at the eye.

To obviate these inconveniences, a mother-of-pearl ring was used by Dr. Brewster, having its interior circumference divided into 360 equal parts. This ring was fixed at the end of a brass tube made to move between the third eye-glass and the diaphragm, so that the divided circumference may be placed exactly in the focus of the glass next the eye. The angle subtended by the diameter of the micrometer may be determined by measuring a base, or by the passage of an equatorial star; from whence the angles subtended by any number of divisions or degrees may be calculated.

The manner of calculating the values of these angles, and a table of the constant part of the formula is given by Dr. B. in No. 113 of the Philosophical Magazine.

By this method of measuring, there is no occasion for turning the micrometer round its axis, because the divided circumference lies in every possible direction. And as the angle to be measured increases, the accuracy of the scale also increases; for when the arch is only 1 or 2 degrees, a variation of one degree produces a variation of about 16 seconds in the angle; but when the arch is between 170 and 180 degrees, the variation of a degree does not change much more than a second in the angle.

In Dr. B.'s own micrometer, the diameter of the field of view is exactly half an inch; the brass tube in which it is fixed is one inch in diameter, and half an inch long, and the degrees of the divided circumference 230th of an inch each.

MICROCOS. In botany, a genus of the class polyandria, order monogynia. Calyx five-leaved; petals five; nectaryless; drupe with a three-celled nut. One species: an East-Indian plant, with terminal, bracted panicle.

MICROPUS. Bastard cudweed. In botany, a genus of the class syngenesia, order polygamia necessaria. Receptacle chaffy; downless; calyx invested with scales; rayless; florets of the margin inclosed in the scales of the calyx. Two species, natives of the south of Europe; one of which, M. supinus, is often cultivated in our own gardens on account of the beauty of its silvery leaves. It is easily propagated by seeds sown in autumn, and requires only common attention and cleanliness.

MICROSCOPE. *s.* [μίκρος and σκοπέω.] an optical instrument composed of lenses or mirrors, by means of which small objects are made to appear larger than they do to the naked eye.

Microscopes are distinguished into simple and compound, or single and double.

Simple, or *Single Microscopes*, are such as consist of a single lens, or a single spherule. And a

Compound Microscope consists of several lenses duly combined. As optics have been improved, other varieties have been contrived in this instrument: hence reflecting microscopes, water microscopes, &c.

It is not certainly known when, or by whom, microscopes were first invented; although it is probable they would soon follow upon the use of telescopes, since a microscope is like a telescope inverted. We are informed by Huygens, that one Drebell, a Dutchman, had the first microscope, in the year 1621, and that he was reputed the inventor of it, though F. Fontana, a Neapolitan, in 1646, claims the invention to himself, and dates it from the year 1618. Be this as it may, it seems they were first used in Germany about 1621. According to Borelli, they were invented by Zacharius Jansen and his son, who presented the first microscopes they had constructed to prince Maurice, and Albert arch-duke of Austria. William Borelli, who gives this account in a letter to his brother Peter, says, that when he was ambassador in England in 1619, Cornelius Drebell shewed him a microscope, which he said was the same that the arch-duke had given him, and had been made by Jansen himself. Borelli De vero Telescopii inventore, pa. 35. See LENS, and DIOPTRICS.

I. *Of Single Microscopes.*—The microscopes made use of by Mr. Leewenhoeck were all, as Mr. Baker assures us, of the single kind, and the construction of them was the most simple possible; each consisting only of a single lens set between two plates of silver perforated with a small hole, with a moveable pin before it to place the object on and adjust it to the eye of the beholder. He informs us also, that the lenses only, and not

globules, were used in every one of these microscopes.

1. The single microscope now most generally known and used is that called Wilson's pocket microscope. See plate 108. fig. 1. The body is made of brass, ivory, or silver, and is represented by AA, BB. CC is a long fine-threaded male screw that turns into the body of the microscope; D a convex glass at the end of the screw. Two concave round pieces of thin brass, with holes of different diameters in the middle of them, are placed to cover the above-mentioned glass, and thereby diminish the aperture when the greatest magnifiers are employed. EE, three thin plates of brass within the body of the microscope; one of which is bent semicircularly in the middle, so as to form an arched cavity for the reception of a tube of glass, the use of the other two being to receive and hold the sliders between them. F, a piece of wood or ivory, arched in the manner of the semicircular plate, and cemented to it. G, the other end of the body of the microscope, where a hollow female screw is adapted to receive the different magnifiers. H, is a spiral spring of steel, between the end G and the plates of brass, intended to keep the plates in a right position and counteract the long screw CC. I is a small turned handle, for the better holding of the instrument, to screw on or off at pleasure.

To this microscope belong six or seven magnifying glasses: six of them are set in silver, brass, or ivory, as in the figure K; and marked 1, 2, 3, 4, 5, 6, the lowest numbers being the greatest magnifiers. L is the seventh magnifier, set in the manner of a little barrel, to be held in the hand for the viewing of any larger object. M is a flat slip of ivory, called a slider, with four round holes through it, wherein to place objects between two pieces of glass or Muscovy talc, as they appear at *d d d d*. Six such sliders, and one of brass, are usually sold with this microscope, some with objects placed in them, and others empty for viewing any thing that may offer: but whoever pleases to make a collection, may have as many as he desires. The brass slider is to confine any small object, that it may be viewed without crushing or destroying it. N, is a tube of glass contrived to confine living objects, such as frogs, fishes, &c. in order to discover the circulation of the blood. All these are contained in a little neat box of fish-skin or mahogany, very convenient for carrying in the pocket.

When an object is to be viewed, thrust the ivory slider in which the said object is placed between the two flat brass plates EE, observing always to put that side of the slider where the brass rings are farthest from the eye. Then screw on the magnifying glass you intend to use, at the end of the instrument G; and looking through it against the light, turn the long screw CC, till your object be brought to suit your eye; which will be known by its appearing perfectly distinct and clear. It is most proper to look at it first through a magnifier that can shew the whole at once, and afterwards to inspect the several parts more particularly with one of the greatest magnifiers; for thus you will gain a true idea of the whole, and of all its parts. And though the greatest magnifiers can shew but a minute portion of any object at once, such as the claw of a flea, the horn of a louse, or the like; yet by gently moving the slider which contains the object, the eye will gradually examine it all over.

As objects must be brought very near the glasses when the greatest magnifiers are made use of, be careful not to scratch them by rubbing the slider against them as you move it in or out. A few turns of the screw CC will easily prevent this mischief, by giving them room enough. You may change the object in your sliders for any others you think proper, by taking out the brass rings with the point of a penknife; the talcs will then fall out, if you but turn the sliders; and after putting what you please between them, by replacing the brass rings you will fasten them as they were before. It is proper to have some sliders furnished with talcs, but without any object between them, to be always in readiness for the examination of fluids, salts, sands, powders, the farina of flowers, or any other casual objects of such sort as need only be applied to the outside of the talc.

The circulation of the blood may be easiest seen in the tails or fins of fishes, in the fine membranes between a frog's toes, or best of all in the tail of a water-newt. If your object be a small fish, place it within the tube N, and spread its tail or fin along the side thereof: if a frog, choose such a one as can but just be got into your tube; and, with a pen, or small stick, expand the transparent membrane between the toes of the frog's hind foot as much as you can. When your object is so adjusted that no part of it can intercept the light from the place you intend to view, unscrew the long screw CC, and thrust your tube into the arched cavity, quite through the body of the microscope; then screw it to the true focal distance, and you will see the blood passing along its vessels with a rapid motion, and in a most surprising manner.

The third or fourth magnifiers may be used for frogs or fishes: but for the tails of water-newts, the fifth or sixth will do; because the globules of their blood are twice as large as those of frogs or fish. The first or second magnifier cannot well be employed for this purpose; because the thickness of the tube in which the object lies will scarce admit its being brought so near as the focal distance of the magnifier.

An apparatus for the purpose of viewing opaque objects generally accompanies this microscope; and which consists of the following parts: A brass arm 2R which is screwed at 2, upon the body of the microscope at G. Into the round hole R, any of the magnifiers suitable to the object to be viewed are to be screwed; and under it, in the same ring, the concave polished silver speculum S. Through a small aperture in the body of the microscope under the brass plates EE, is to slide the long wire with the forceps T; this wire is pointed at one of its ends; and so, that either the points or forceps may be used for the objects as may be necessary. It is easy to conceive, therefore, that the arm at R, which turns by a twofold joint at *a* and *b*, may be brought with its magnifier over the object, the light reflected upon it by the application of the speculum, and the true focus obtained by turning the male screw CC as before directed. As objects are sometimes not well fixed for view, either by the forceps or point, the small piece shewn at N is added, and in such cases answers better: it screws over the point of T; it contains a small round piece of ivory, blackened on one side, and left white upon the other as a contrast to coloured objects, and by a small piece of watch-spring fastens down the objects upon the ivory.

2. *Single Microscope by Reflection.* In fig. 2. A is

a scroll of brass fixed upright upon a round wooden base B, or mahogany drawer or case, so as to stand perfectly firm and steady. C is a brass screw, that passes through a hole in the upper limb of the scroll into the side of the microscope D, and screws it fast to the said scroll. E is a concave speculum set in a box of brass, which hangs in the arch G by two small screws *f f*, that screw into the opposite sides thereof. At the bottom of this arch is a pin of the same metal, exactly fitted to a hole *b* in the wooden pedestal, made for the reception of the pin. As the arch turns on this pin, and the speculum turns on the end of the arch, it may, by this twofold motion, be easily adjusted in such a manner as to reflect the height of the sun, of the sky, or of a candle, directly upwards through the microscope that is fixed perpendicularly over it; and by so doing may be made to answer many purposes of the large double reflecting microscope. The body of the microscope may also be fixed horizontally, and objects viewed in that position by any light you choose, which is an advantage the common double reflecting microscope has not. It may also be rendered further useful by means of a slip of glass; one end of which being thrust through between the plates where the sliders go, and the other extending to some distance, such objects may be placed thereon as cannot be applied in the sliders: and then, having a limb of brass that may fasten to the body of the microscope, and extend over the projecting glass a hollow ring wherein to screw the magnifiers, all sorts of subjects may be examined with great convenience, if a hole be made in the pedestal, to place the speculum exactly underneath, and thereby throw up the rays of light. "The pocket-microscope, thus mounted (says Mr. Baker), is as easy and pleasant in its use, as fit for the most curious examination of the animalcules and salts in fluids, of the farinæ in vegetables, and of the circulation in small animals; in short, is as likely to make considerable discoveries in objects that have some degree of transparency, as any microscope I have ever seen or heard of."

The brass scroll A is now generally made to unscrew into three parts, and pack with the microscope and apparatus into the drawer of a mahogany pocket-case, upon the lid of which the scroll is made to fix when in use.

The opaque apparatus also, as above described, is applicable this way by reflection. It only consists in turning the arm R (fig. 1.), with the magnifier over the concave speculum below (fig. 2.), or to receive the light as reflected obliquely from it: the silver speculum screwed into R will then reflect the light, which it receives from the glass speculum strongly upon the object that is applied upon the wire T underneath.

This microscope, however, is not upon the most convenient construction, in comparison with others now made: it has been esteemed for many years past from its popular name and recommendation by its makers. Its portability is certainly a great advantage in its favour; but in most respects it is superseded by the microscopes hereafter described.

3. *Microscope for Opaque Objects, called the Single Opaque Microscope.*—This microscope remedies the inconvenience of having the dark side of an object next the eye, which formerly was an insurmountable objection to the making observations on opaque objects with any considerable degree of exactness or satisfaction: for, in all other contrivances commonly known, the nearness of the instrument to the object (when glasses that magnify much are used) unavoidably overshadows it so much, that its appearance is rendered obscure and indistinct. And, notwithstanding ways have been tried to point light upon an object, from the sun or a candle, by a convex glass placed on the side thereof, the rays from either can be thrown upon it in such an acute angle only, that they serve to give a confused glare, but are insufficient to afford a clear and perfect view of the object. But by this microscope, by means of a concave speculum of silver highly polished, in whose centre a magnifying lens is placed, such a strong and direct light is reflected upon the object, that it may be examined with all imaginable ease and pleasure. The several parts of this instrument, made either of brass or silver, are as follow:

Through the first side A, passes a fine screw, B, the other end of which is fastened to the moveable side C. D is a nut applied to this screw, by the turning of which the two sides A and C are gradually brought together. E is a spring of steel that separates the two sides when the nut is unscrewed. F is a piece of brass, turning round in a socket, whence proceeds a small spring tube moving upon a rivet; through which tube there runs a steel wire, one end whereof terminates in a sharp point G, and the other with a pair of pliers H fastened to it. The point and pliers are to thrust into, or take up and hold, any insect or object; and either of them may be turned upwards, as best suits the purpose. I is a ring of brass, with a female screw within it, mounted on an upright piece of the same metal; which turns round on a rivet, that it may be set at a due distance when the least magnifiers are employed. This ring receives the screws of all the magnifiers. K is a concave speculum of silver, polished as bright as possible; in the centre of which is placed a double convex lens, with a proper aperture to look through it. On the back of this speculum a male screw L is made to fit the brass ring I, to screw into it at pleasure. There are four of these concave specula of different depths, adapted to four glasses of different magnifying powers, to be used as the objects to be examined may require. The greatest magnifiers have the least apertures. M is a round object-plate, one side of which is white and the other black: the intention of this is to render objects the more visible, by placing them, if black, on the white side, or, if white, on the black side. A steel spring N turns down on each side to make any object fast; and issuing from the object-plate is a hollow pipe to screw it on the needle's point G. O is a small box of brass, with a glass on each side, contrived to confine any living object in order to examine it: this also has a pipe to screw upon the end of the needle G. P is a turned handle of wood, to screw into the instrument when it is made use of. Q, a pair of brass pliers to take up any object, or manage it with conveniency. R is a soft hair brush for cleaning the glasses, &c. S is a small ivory box for talcs, to be placed, when wanted, in the small brass box O.

When you would view any object with this microscope, screw the speculum, with the magnifier you think proper to use, into the brass ring I. Place your object, either on the needle G in the pliers H, on the object-plate M, or in the hollow brass box O, as may be most convenient: then, holding up your instrument by the handle P, look against the light through the magnifying lens; and by means of the nut D, together with the mo-

tion of the needle, by managing its lower end, the object may be turned about, raised, or depressed, brought nearer the glass, or removed farther from it, till you find the true focal distance, and the light be seen strongly reflected from the speculum upon the object, by which means it will be shewn in a manner surprisingly distinct and clear; and for this purpose the light of the sky or of a candle will answer very well. Transparent objects may also be viewed by this microscope; only observing, that when such come under examination, it will not always be proper to throw on them the light reflected from the speculum; for the light transmitted through them, meeting the reflected light, may together produce too great a glare. A little practice, however, will shew how to regulate both lights in a proper manner.

4. *Ellis's Single and Aquatic Microscope.* Fig. 4. represents a very convenient and useful microscope contrived by Mr. John Ellis, author of an Essay upon Corallines, &c. To practical botanists, observers of animalcula, &c. it possesses many advantages above those just described. It is portable, simple in its construction, expeditious, and commodious in use. K represents the box containing the whole apparatus: it is generally made of fish-skin; and on the top there is a female screw, for receiving the screw that is at the bottom of the pillar A: this is a pillar of brass, and is screwed on the top of the box. D is a brass pin which fits into the pillar; on the top of this pin is a hollow socket to receive the arm which carries the magnifiers; the pin is to be moved up and down, in order to adjust the lenses to their focal or proper distance from the object.—(N.B. In the representations of this microscope, the pin D is delineated as passing through a socket at one side of the pillar A; whereas it is usual at present to make it pass down a hole bored through the middle of the pillar.) E, the bar which carries the magnifying lens; it fits into the socket X, which is at the top of the pin or pillar D. This arm may be moved backwards and forwards in the socket X, and sideways by the pin D; so that the magnifier, which is screwed into the ring at the end E of this bar, may be easily made to traverse over any part of the object that lies on the stage or plate B. FF is a polished silver speculum, with a magnifying lens placed at the centre thereof, which is perforated for this purpose. The silver speculum screws into the arm E, as at F. G, another speculum, with its lens, which is of a different magnifying power from the former. H, the semicircle which supports the mirror I; the pin R, affixed to the semicircle H, passes through the hole which is towards the bottom of the pillar A. B, the stage, or the plane, on which the objects are to be placed; it fits into the small dove-tailed arm which is at the upper end of the pillar DA. C, a plane glass, with a small piece of black silk stuck on it; this glass is to lay in a groove made on the stage B. M, a hollow glass to be laid occasionally on the stage instead of the plane glass C. L, a pair of nippers. These are fixed to the stage by the pin at the bottom; the steel wire of these nippers slides backwards and forwards in the socket, and this socket is moveable upwards and downwards by means of the joint, so that the position of the object may be varied at pleasure. The object may be fixed in the nippers, stuck on the point, or affixed, by a little gum-water, &c. to the ivory cylinder N, which occasionally screws to the point of the nippers.

To *use* this microscope: Take all the parts of the apparatus out of the box; then begin by screwing the pillar A to the cover thereof; pass the pin R of the semicircle which carries the mirror through the hole that is near the bottom of the pillar A; push the stage into the dove-tail at B, slide the pin into the pillar (see the N. B. above); then pass the bar E through the socket which is at the top of the pin D, and screw one of the magnifying lenses into the ring at F. The microscope is now ready for use: and though the enumeration of the articles may lead the reader to imagine the instrument to be of a complex nature, we can safely affirm that he will find it otherwise. The instrument has this peculiar advantage, that it is difficult to put any of the pieces in a place which is appropriated to another. Let the object be now placed either on the stage or in the nippers L, and in such manner that it may be as nearly as possible over the centre of the stage: bring the speculum F over the part you mean to observe; then throw as much light on the speculum as you can, by means of the mirror I, and the double motion of which it is capable; the light received on the speculum is reflected by it on the object. The distance of the lens F from the object is regulated by moving the pin D up and down, until a distinct view of it is obtained. The best rule is, to place the lens beyond its focal distance from the object, and then gradually to slide it down till the object appears sharp and well defined. The adjustment of the lenses to their focus, and the distribution of the light on the object, are what require the most attention: on the first the distinctness of the vision depends; the pleasure arising from a clear view of the parts under observation is due to the modification of the light. No precise rule can be given for attaining accurately these points; it is from practice alone that ready habits of obtaining these necessary properties can be acquired, and with the assistance of this no difficulty can be found.

5. A very simple and convenient microscope for botanical and other purposes, though inferior in many respects to that of Mr. Ellis, was contrived by the late ingenious Mr. Benjamin Martin, and is represented at fig. 5. where AB represents a small arm supporting two or more magnifiers, one fixed to the upper part as at B, the other to the lower part of the arm at C; these may be used separately, or combined together. The arm AB is supported by the square pillar IK, the lower end of which fits into the socket E of the foot FG; the stage DL is made to slide up and down the square pillar; H, a concave mirror for reflecting light on the object.—To *use* this microscope, place the object on the stage, reflect the light on it from the concave mirror, and regulate it to the focus, by moving the stage near to or farther from the lens at B. The ivory sliders pass through the stage; other objects may be fixed in the nippers MN, and then brought under the eye-glasses; or they may be laid on one of the glasses which fit the stage. The apparatus to this instrument consists of three ivory sliders; a pair of nippers; a pair of forceps; a flat glass and a concave ditto, both fitted to the stage.

The two last microscopes are frequently fitted up with a toothed rack and pinion, for the more ready adjustment of the glasses to their proper focus.

6. *Withering's Portable Botanic Microscope.*—Fig. 6. represents a small botanical microscope contrived by Dr. Withering, and described by him in his Botanical Arrangements. It consists of three brass

plates, A, B, C, which are parallel to each other; the wires D and E are riveted into the upper and lower plates, which are by this means united to each other; the middle plate or stage is moveable on the aforesaid wires by two little sockets which are fixed to it. The two upper plates each contain a magnifying lens, but of different powers; one of these confines and keeps in their places the fine point F, the forceps G, and the small knife H.—To use this instrument, unscrew the upper lens, and take out the point, the knife, and the forceps; then screw the lens on again, place the object on the stage, and then move it up or down till you have gained a distinct view of the object, as one lens is made of a shorter focus than the other; and spare lenses of a still deeper focus may be had if required. This little microscope is the most portable of any. Its principal merit is its simplicity.

7. *Botanical Lenses or Magnifiers.*—The haste with which botanists, &c. have frequently occasion to view objects, renders an extempore pocket-glass indispensably necessary. The most convenient of any yet constructed appears to be that contrived, in regard to the form of the mounting, by the late Mr. Benjamin Martin; and is what he called a hand megalascope, because it is well adapted for viewing all the larger sort of small objects universally, and by only three lenses it has seven different magnifying powers.

Fig. 7. represents the case with the three frames and lenses, which are usually of 1, 1½, and 2 inches focus: they all turn over each other, and shut into the case, and are turned out at pleasure.

The three lenses singly afford three magnifying powers; and by combining two and two, we make three more: for *d* with *e* makes one, *d* with *f* another, and *e* with *f* a third; which, with the three singly, make six; and lastly, all three combined together make another; so that, upon the whole, there are seven powers of magnifying with these glasses only.

When the three lenses are combined, it is better to turn them in, and look through them by the small apertures in the sides of the case. The eye in this case is excluded from extra light; the aberration of the superfluous rays through the glasses is cut off; and the eye coincides more exactly with the common axes of the lenses.

A very useful and easy kind of microscope (described by Joblot, and which has been long in use), adapted chiefly for viewing, and confining at the same time, any living insects, small animals, &c. is shewn at fig. 8. where A represents a glass tube, about 1½ inches diameter, and 2 inches high. B, a case of brass or wood, containing a sliding tube, with two or three magnifying glasses that may be used either separately or combined. In the inside, at the bottom, is a piece of ivory, black and white on opposite sides, that is occasionally removed, and admits a point to be screwed into the centre. The cap unscrews at D, to admit the placing of the object: the proper distance of the glasses from the object is regulated by pulling up or down the brass tube E at top containing the eye-glasses.

This microscope is particularly useful for exhibiting the well-known curious curculio imperialis, vulgarly called the diamond beetle, to the greatest advantage; for which, as well as for other objects, a glass bottom and a polished reflector at the top are often applied, to condense the light upon the object. In this case, the stand and brass bottom F, as shewn in the same figure, are taken away by unscrewing.

9. *Mr. Lyonet's Single Anatomical Dissecting Microscope.*—Fig. 9. represents a curious and extremely useful microscope, invented by that gentleman for the purpose of minute dissections and microscopic preparations. This instrument must be truly useful to amateurs for the minutiæ of insects, &c. being the best adapted of any for the purposes of dissection. With this instrument Mr. Lyonet made his very curious microscopical dissection of the *chenille de saule*, as related in his Traité Anatomique de la chenille qui ronge le bois de saule, 4to.

AB is the anatomical table, which is supported by a pillar NO; this is screwed on the foot CD. The table AB is prevented from turning round by means of two steady pins. In this table or board there is a hole G, which is exactly over the centre of the mirror EF, that is to reflect the light on the object; the hole G is designed to receive a flat or concave glass, on which the objects for examination are to be placed.

RXZ is an arm formed of several balls and sockets, by which means it may be moved in every possible situation; it is fixed to the board by means of the screw H. The last arm IZ has a female screw, into which a magnifier may be screwed as at Z. By means of the screw H, a small motion may be occasionally given to the arm IZ, for adjusting the lens with accuracy to its focal distance from the object.

Another chain of balls is sometimes used, carrying a lens to throw light upon the object; the mirror is likewise so mounted, as to be taken from its place at K, and fitted on a clamp, by which it may be fixed to any part of the table AB.

To use the dissecting table.—Let the operator sit with his left side near a light window; the instrument being placed on a firm table, the side DH towards the stomach, the observations should be made with the left eye. In dissecting, the two elbows are to be supported by the table on which the instrument rests, the hands resting against the board AB; and in order to give it greater stability (as a small shake, though imperceptible to the naked eye, is very visible in the microscope), the dissecting instruments are to be held one in each hand, between the thumb and two forefingers.

II. *Of Double Microscopes, commonly called Compound Microscopes.*

Double microscopes are so called, from being a combination of two or more lenses.

The particular and chief advantages which the compound microscopes have over the single are, that the objects are represented under a larger field of view, and with a greater amplification of reflected light.

1. *Culpeper's Microscope.*—The compound microscope, originally contrived by Mr. Culpeper, is represented at fig. 10. Pl. 109. It consists of a large external brass body A, B, C, D, supported upon three scrolls, which are fixed to the stage EF; the stage is supported by three larger scrolls, that are screwed to the mahogany pedestal GH. There is a drawer in the pedestal, which holds the apparatus. The concave mirror *I* is fitted to a socket in the centre of the pedestal. The lower part LMCD of the body forms an exterior tube, into which the upper part of the body ABLM slides, and may be moved up or down, so as to bring the magnifiers,

which are screwed on at N, nearer to or farther from the object.

To *use* this microscope:—Screw one of the buttons, which contains a magnifying lens, to the end N of the body; place the slider, with the objects, between the plates of the slider-holder. Then, to attain distinct vision, and a pleasing view of the object, adjust the body to the focus of the lens you are using, by moving the upper part gently up and down, and regulate the light by the concave mirror.

For opaque objects, two additional pieces must be used. The first is a cylindrical tube of brass (represented at L, fig. 11.), which fits on the cylindrical part at N of the body The second piece is the concave speculum *h*; this is to be screwed to the lower end of the aforesaid tube: the upper end of this tube should be made to coincide with the line which has the same number affixed to it as to the magnifier you are using; *ex. gr.* if you are making use of the magnifier marked 5, slide the tube to the circular line on the tube N, that is marked also with No. 5. The slider-holder should be removed when you are going to view opaque objects, and a plane glass should be placed on the stage in its stead to receive the object; or it may be placed in the nippers, the pin of which fits into the hole in the stage.

The apparatus belonging to this microscope consists of the following particulars; viz. Five magnifiers, each fitted in a brass button: one of these is seen at N, fig. 10. Six ivory sliders, five of them with objects. A brass tube to hold the concave speculum. The concave speculum in a brass box. A fish-pan. A set of glass tubes. A flat glass fitted to the stage. A concave glass fitted to the stage. A pair of forceps. A steel wire with a pair of nippers at one end and a point at the other. A small ivory cylinder, to fit on the pointed end of the aforesaid nippers. A convex lens, moveable in a brass semicircle; this is affixed to a long brass pin, which fits into a hole on the stage.

The construction of the foregoing microscope is very simple, and it is easy in use; but the advantages of the stage and mirror are too much confined for an extensive application and management of all kinds of objects. Its greatest recommendation is its cheapness; and to those who are desirous of having a compound microscope at a low price, it may be acceptable.

2. *Cuff's Microscope.*—The improved microscope next in order is that of Mr. Cuff. Besides remedying the disadvantages above mentioned, it contains the addition of an adjusting screw, which is a considerable improvement, and highly necessary to the examination of objects under the best defined appearance from the glasses. It is represented at fig. 11. with the apparatus that usually accompanies it. A, B, C, shews the body of this microscope, which contains an eye-glass at A, a broad lens at B, and a magnifier which is screwed on at C. The body is supported by the arm DE, from which it may be removed at pleasure. The arm DE is fixed on the sliding bar F, and may be raised or depressed to any height within its limits. The main pillar *ab* is fixed in the box *bc*; and by means of the brass foot *d* is screwed to the mahogany pedestal XY, in which is a drawer containing all the apparatus. O is a milled-headed screw, to tighten the bar F when the adjusting screw *eg* is used. *pq* is the stage, or plate, which carries the objects; it has a hole at the centre *n*. G a concave mirror, that may be turned in any direction, to reflect the light of a candle, or the sky, upon the object.

To *use* this microscope:—Screw the magnifier you intend to use to the end C of the body, place the slider-holder P in the hole *n*, and the slider with the object between the plates of the slider-holder; set the upper edge of the bar DE to coincide with the divisions which correspond to the magnifier you have in use, and pinch it by the milled nut; now reflect a proper quantity of light upon the object, by means of the concave mirror G, and regulate the body exactly to the eye and the focus of the glasses by the adjusting screw *eg*.

To view opaque objects, take away the slider-holder P, and place the object on a flat glass under the centre of the body, or on one end of the jointed nippers *op*. Then screw the silver concave speculum *h* to the end of the cylinder L, and slide this cylinder on the lower part of the body, so that the upper edge thereof may coincide with the line which has the same mark with the magnifier that is then used; reflect the light from the concave mirror G to the silver speculum, from which it will again be reflected on the object. The glasses are to be adjusted to their focal distance, as before directed.

The apparatus consists of a convex lens H, to collect the rays of light from the sun or a candle, and condense them on the object. L a cylindrical tube, open at each side, with a concave speculum screwed to the lower end *h*. P the slider-holder: this consists of a cylindrical tube, in which an inner tube is forced upwards by a spiral spring; it is used to receive an ivory slider K, which is to be slid between the plates *h* and *i*. The cylinder P fits the hole *n* in the stage; and the hollow part at *k* is designed to receive a glass tube. R is a brass cone, to be put under the bottom of the cylinder P, to intercept occasionally some of the rays of light. S a box containing a concave and a flat glass, between which a small living insect may be confined: it is to be placed over the hole *n*. T a flat glass, to lay any occasional object upon; there is also a concave one for fluids. O is a long steel wire, with a small pair of pliers at one end, and a point at the other, designed to stick or hold objects; it slips backwards and forwards in the short tube *o*; the pin *p* fits into the hole of the stage. W a little round ivory box, to hold a supply of talc and rings for the sliders. V a small ivory cylinder, that fits on the pointed end of the steel wire: it is designed for opaque objects. Light-coloured ones are to be struck upon the dark side, and *vice versa*. M a fish-pan, whereon to fasten a small fish, to view the circulation of the blood: the tail is to be spread across the oblong hole *k* at the small end, and tied fast by means of a ribband fixed thereto: the knob *l* is to be shoved through the slit made in the stage, that the tail may be brought under the magnifier.

3. This microscope has received several material improvements from Mr. Martin, Mr. Adams, &c. By an alteration, or rather an enlargement, of the body of the tube which contains the eye-glasses, and also of the eye-glasses themselves, the field of view is made much larger, the mirror below for reflecting light is made to move upon the same bar with the stage; by which means the distance of it from the stage may be very easily and suitably varied. A condensing glass is applied under the stage in the slider-holder, in order to modify and increase the light that is reflected by the mirrors

below from the light of a candle or lamp. It is furnished also with two mirrors in one frame, one concave and the other plane, of glass silvered; and by simply unscrewing the body, the instrument, when desired, may be converted into a single microscope. Fig. 12. is a representation of the instrument thus improved; and the following is the description of it, as given by Mr. Adams in his Essays.

AB represents the body of the microscope, containing a double eye-glass and a body-glass: it is here shown as screwed to the arm CD, from whence it may be occasionally removed, either for the convenience of packing, or when the instrument is to be used as a single microscope.

The eye-glasses and the body-glasses are contained in a tube which fits into the exterior tube AB; by pulling out a little this tube when the microscope is in use, the magnifying power of each lens is increased.

The body AB of the microscope is supported by the arm CD; this arm is fixed to the main pillar CF, which is screwed firmly to the mahogany pedestal GH; there is a drawer to this pedestal, which holds the apparatus.

NIS, The plate or stage which carries the slider-holder KL: this stage is moved up or down the pillar CF, by turning the milled nut M; this nut is fixed to a pinion, that works in a toothed rack cut on one side of the pillar. By means of this pinion, the stage may be gradually raised or depressed, and the object adjusted to the focus of the different lenses.

KL is a slider-holder, which fits into a hole that is in the middle of the stage NIS; it is used to confine and guide either the motion of the sliders which contain the objects, or the glass tubes that are designed to confine small fishes for viewing the circulation of the blood. The sliders are to be passed between the two upper plates, the tubes through the bent plates.

L is a brass tube, to the upper part of which is fixed the condensing lens before spoken of; it fits into the under part of the slider-holder KL, and may be set at different distances from the object, according to its distance from the mirror or the candle.

O is the frame which holds the two reflecting mirrors, one of which is plane, the other concave. These mirrors may be moved in various directions, in order to reflect the light properly, by means of the pivots on which they move, in the semicircle QSR, and the motion of the semicircle itself on the pin S: the concave mirror generally answers best in the daytime; the plane mirror combines better with the condensing lens, and a lamp or candle. At D there is a socket for receiving the pin of the arm Q (fig. 31.), to which the concave speculum, for reflecting light on opaque objects, is fixed. At S is a hole and slit for receiving either the nippers L (fig. 31. pl. 7.) or the fish-pan I; when these are used, the slider-holder must be removed. T, a hole to receive the pin of the convex lens M, fig. 31.

To *use* this microscope:—Take it out of the box. Screw the body into the round end of the upper part of the arm CD. Place the brass sliders, which contain the magnifiers, into the dove-tailed slit which is on the under side of the aforesaid arm, as seen at E, and slide it forwards until the magnifier you mean to use is under the centre of the body. opposite to each magnifier in this slit there is a notch, and in the dove-tailed part of the arm CD there is a spring, which falls into the above-mentioned notch, and thus makes each magnifier coincide with the centre of the body. Pass the ivory slider you intend to use between the upper plates of the slider-holder KL, and then reflect as strong a light as you can on the object by means of one of the mirrors; after this, adjust the object to the focus of the magnifier and your eye, by turning the milled screw M, the motion of which raises and depresses the stage NIS. The degree of light necessary for each object, and the accuracy required in the adjustment of the lenses to their proper focal distance from the object, will be easily attained by a little practice.

When opaque objects are to be examined, remove the slider-holder, and place the object on a flat glass, or fix it to the nippers L, the pin of these fit into the hole on the stage; screw the concave speculum R into the arm Q (fig. 31), and then pass the pin of this arm through the socket D, fig. 12; the light is now to be reflected from the concave mirror to the silver speculum, and from this down on the object. No exact rule can be given for reflecting the light on the object; we must therefore refer the reader to the mother of all aptness, practice. The speculum must be moved lower or higher, to suit the focus of the different magnifiers and the nature of the object.

The foregoing directions apply equally to the using of this instrument as a single microscope; with this difference only, that the body A B is then removed, and the eye is applied to the upper surface of the arm CD, exactly over the magnifiers.

This microscope is sometimes made with the following alterations, which are supposed to make it still more convenient and useful. The arm CD that carries the body and magnifiers is made both to turn on a pin, and to slide backwards and forwards in a socket at C; so that instead of moving the objects below on the stage, and disturbing them, the magnifiers are more conveniently brought over any part of the objects as desired. The condensing glass is made larger, and slides upon the square bar CF quite distinct from the stage, like the mirrors below; and it is thereby made useful for any other objects that may be applied on glasses fitted to the stage, as well as those put into the slider-holder K. It is thereby not confined to this stage alone, as in the preceding. When the body AB is taken away, the arm CD may be slipt away from its bar, with the magnifiers, and the forceps, wire, and joint, applied to R; and it thereby serves the purpose of a small hand single or opaque microscope, for any object occasionally applied to this wire. The magnifiers in the slider E are mounted in a wheel case, which perhaps prevents its being in the way so much as the long slider E before described.—This contrivance is represented at X, fig. 12.

4. *Martin's New Universal Compound Microscope.*—This instrument was originally constructed by the late Mr. Benjamin Martin, and intended to comprise all the uses and advantages of the single, compound, opaque, and aquatic microscopes. The following is a description of it as now made, with a few alterations, chiefly suggested (we are told) by Mr. Jones of Holborn.

Fig. 13. is a representation of the instrument placed up for use. A, B, C, D, is the body of the microscope: which consists of four parts, viz. AB the eye-piece, or that containing the eye-glasses, and is screwed into C, which is a moveable or sliding tube on the top; this inner tube contains the body-glass screwed into its lower part D is the

exterior tube or case, in which the other slides up and down in an easy and steady manner. This motion of the tube C is useful to increase or decrease the magnifying power of the body-glass when thought necessary, as before mentioned. E is a pipe or snout screwed on to the body of the microscope D, and at its lower part, over the several magnifying lenses hereafter described. FGHI is the square stem of the microscope, upon which the stage R moves in an horizontal position, upwards or downwards, by means of the fine rackwork of teeth and pinion. KL is a strong solid joint and pillar, by which the position of the instrument is readily altered from a vertical one to an oblique or to a perfectly horizontal one, as may be required: it is thus well adapted to the ease of the observer either sitting or standing; and as it is very often convenient to view objects by direct unreflected light, when the square stem FI is placed in an horizontal position for this purpose, the mirror T is then to be taken off in order to prevent the obstruction of the rays. M is a circular piece of brass, serving as a base to the pillar. NOP, the tripod or foot by which the whole body of the microscope is steadily supported; it folds up when packed into the case. W is a brass frame, that contains the condensing lens, and acts in conjunction with the large concave and plane mirrors below at T; the reflected rays from which, either of the common light or of that of a candle or lamp, it agreeably modifies, and makes steady in the field of view.

The particulars of the apparatus to this microscope are as follow: Q is a circular brass box, containing six magnifiers or object lenses, numbered 1, 2, 3, 4, 5, 6; the digits of which appear severally through a small round hole in the upper plate of it. To the upper side is fixed a small circle of brass, by which it is connected with, and screwed into, the round end of the arm *abcd;* which is a long piece of brass, and moves through either by teeth or pinion, or not, as may be desired, in *ef;* which is a socket on the upper part of the pillar, and admits, with a motion both easy and steady, the brass arm. R is a fixed stage, upon which the objects to be viewed are to be placed: it is firmly fastened to the square pillar, which is moved by the rackwork. In the middle is a large circular hole, for receiving concave glasses, with fluids, &c. it has also a sliding spring-frame to fasten down slips of glass or other things: at *abc* are three small sockets or holes, intended to receive several parts of the apparatus. S is the refractor, or illuminating lens, for converging the sun's rays upon opaque objects laid upon the stage R. To this purpose it moves on a semicircle upon a long shank *g*, in a spring socket *h*, in the arm *i;* this arm moving every way by a stout pin *k* in the socket *a* of the stage. In this manner it is easily adjusted to any position of the sun, candle, &c.—T, the reflecting-glass frame, containing a concave and plane speculum, which is moved upon the square pillar by the hand. The use of it is to illuminate all transparent objects that are applied to the stage above.

Fig. 14, plate 110, N° 1, is an auxiliary moveable stage; which by means of a pin *k* is placed in the hole *a* of the stage R, and can be moved in an horizontal direction over the whole field of the stage. In this stage there are three circular holes with shouldered bottoms: a large one in the middle, and on each side a small one, for the reception of the three following necessary articles: N° 2, a watch-glass to be placed in the large hole, to hold fluids containing animalcules, &c.; a circular piece of ivory, N° 3, one side of which is black, the other white, to support opaque objects of different contrasted colours; and circular plane and concave glasses, N° 4, for extemporaneous transparent objects.—The same use is made of the other small hole as of the large one, only in a lesser degree, to receive small concave glasses, plates, &c.

N° 5, is the silvered speculum, called a *liberkuhn*, which makes the single opaque microscope, by being screwed to the slider *abcd* (fig. 13.) instead of the box of lenses Q, and the body AE above it. The chief use of this is to view very small objects strongly illuminated near the compounded focus of the mirror T (fig. 15.) N° 6, is the forceps, or pliers, for holding such kind of objects, and by which they can be applied very readily to the focus of the lens in the liberkuhn. They have a motion all ways by means of the spring socket *a*, the joint *b*, and the shank *c:* they are placed in the socket *c* of the fixed stage R (fig. 13.) N° 7, is a small piece of ivory, to be placed upon the pointed end of the pliers; it is black upon one side, and white upon the other, to receive opaque objects.

N° 8, is a liberkuhn of a larger size than that first mentioned, with a hole in its centre: this is screwed into N° 9, the hole *a* of a brass ring, fastened to a long wire *b;* which moves up and down in the spring socket *b* of the stage R, in which it also moves sideways; and thus, with the body AE above, forms an aquatic compound microscope for showing all sorts of objects in water and other fluids placed under it in the watch-glass N° 2, on the stage.

N° 11, is a cone with a proper aperture *a* to exclude superfluous light, that would disturb a critical observation of a curious object; it is placed on the under side of the fixed stage R.

N° 12, is what is usually called a bug-box, consisting of a concave glass with a plane one screwed over it; by means of which a bug, louse, flea, &c. may be secured and viewed alive. It is to be placed on either of the stages R (fig. 13.), or N° 1, (fig. 14.)

N° 13, is the fish-pan. In the long concave body *ab*, a fish may be so confined by the ribband *c*, that the transparent tail may be in part over the slit or hole at *a*. In this state, it is placed on the stage R, with the pin *d* in the hole *e* of the stage, and moves freely and horizontally for viewing the circulation of the blood, &c.

N° 14, is the slider-holder that is placed on the stage R: it receives the sliders and tubes when filled with transparent objects, to be viewed either by the compound or single microscope.

N° 15, represents the ivory slider, to hold the objects between the talcs as usual.

N° 16, is a useful auxiliary slider framed in brass. In this slider small concave glasses are cemented; and a slip of plane glass slides over them; by which any small living object, as mites, &c. may be confined without injury, and deliberately viewed.

N° 17, represents a set of glass tubes, three in number, one within another; they are useful for small tad-poles, water-newts, eels, &c. when the circulation of the blood is to be viewed. There is a small hole at one end of each tube, that serves to admit the air; for, when they are filled with water, the other end is stopped with a cork.

N° 18, is a small ivory box, containing spare talcs and wires, to supply the sliders with occasionally.

N° 19, a brass cell or button, containing a very small lens, properly set between two small plates of brass, that it may be brought very near to the object when viewed therewith as a single microscope.

below from the light of a candle or lamp. It is furnished also with two mirrors in one frame, one concave and the other plane, of glass silvered; and by simply unscrewing the body, the instrument, when desired, may be converted into a single microscope. Fig. 12. is a representation of the instrument thus improved; and the following is the description of it, as given by Mr. Adams in his Essays.

AB represents the body of the microscope, containing a double eye-glass and a body-glass: it is here shown as screwed to the arm CD, from whence it may be occasionally removed, either for the convenience of packing, or when the instrument is to be used as a single microscope.

The eye-glasses and the body-glasses are contained in a tube which fits into the exterior tube AB; by pulling out a little this tube when the microscope is in use, the magnifying power of each lens is increased.

The body AB of the microscope is supported by the arm CD; this arm is fixed to the main pillar CF, which is screwed firmly to the mahogany pedestal GH; there is a drawer to this pedestal, which holds the apparatus.

NIS, The plate or stage which carries the slider-holder KL: this stage is moved up or down the pillar CF, by turning the milled nut M; this nut is fixed to a pinion, that works in a toothed rack cut on one side of the pillar. By means of this pinion, the stage may be gradually raised or depressed, and the object adjusted to the focus of the different lenses.

KL is a slider-holder, which fits into a hole that is in the middle of the stage NIS; it is used to confine and guide either the motion of the sliders which contain the objects, or the glass tubes that are designed to confine small fishes for viewing the circulation of the blood. The sliders are to be passed between the two upper plates, the tubes through the bent plates.

L is a brass tube, to the upper part of which is fixed the condensing lens before spoken of; it fits into the under part of the slider-holder KL, and may be set at different distances from the object, according to its distance from the mirror or the candle.

O is the frame which holds the two reflecting mirrors, one of which is plane, the other concave. These mirrors may be moved in various directions, in order to reflect the light properly, by means of the pivots on which they move, in the semicircle QSR, and the motion of the semicircle itself on the pin S: the concave mirror generally answers best in the daytime; the plane mirror combines better with the condensing lens, and a lamp or candle. At D there is a socket for receiving the pin of the arm Q (fig. 31.), to which the concave speculum, for reflecting light on opaque objects, is fixed. At S is a hole and slit for receiving either the nippers L (fig. 31. pl. 7.) or the fish-pan I; when these are used, the slider-holder must be removed. T, a hole to receive the pin of the convex lens M, fig. 31.

To *use* this microscope:—Take it out of the box. Screw the body into the round end of the upper part of the arm CD. Place the brass sliders, which contain the magnifiers, into the dove-tailed slit which is on the under side of the aforesaid arm, as seen at E, and slide it forwards until the magnifier you mean to use is under the centre of the body. opposite to each magnifier in this slit there is a notch, and in the dove-tailed part of the arm CD there is a spring, which falls into the above-mentioned notch, and thus makes each magnifier coincide with the centre of the body. Pass the ivory slider you intend to use between the upper plates of the slider-holder KL, and then reflect as strong a light as you can on the object by means of one of the mirrors; after this, adjust the object to the focus of the magnifier and your eye, by turning the milled screw M, the motion of which raises and depresses the stage NIS. The degree of light necessary for each object, and the accuracy required in the adjustment of the lenses to their proper focal distance from the object, will be easily attained by a little practice.

When opaque objects are to be examined, remove the slider-holder, and place the object on a flat glass, or fix it to the nippers L, the pin of these fit into the hole on the stage; screw the concave speculum R into the arm Q (fig. 31), and then pass the pin of this arm through the socket D, fig. 12; the light is now to be reflected from the concave mirror to the silver speculum, and from this down on the object. No exact rule can be given for reflecting the light on the object; we must therefore refer the reader to the mother of all aptness, practice. The speculum must be moved lower or higher, to suit the focus of the different magnifiers and the nature of the object.

The foregoing directions apply equally to the using of this instrument as a single microscope; with this difference only, that the body A B is then removed, and the eye is applied to the upper surface of the arm CD, exactly over the magnifiers.

This microscope is sometimes made with the following alterations, which are supposed to make it still more convenient and useful. The arm CD that carries the body and magnifiers is made both to turn on a pin, and to slide backwards and forwards in a socket at C; so that instead of moving the objects below on the stage, and disturbing them, the magnifiers are more conveniently brought over any part of the objects as desired. The condensing glass is made larger, and slides upon the square bar CF quite distinct from the stage, like the mirrors below; and it is thereby made useful for any other objects that may be applied on glasses fitted to the stage, as well as those put into the slider-holder K. It is thereby not confined to this stage alone, as in the preceding. When the body AB is taken away, the arm CD may be slipt away from its bar, with the magnifiers, and the forceps, wire, and joint, applied to R; and it thereby serves the purpose of a small hand single or opaque microscope, for any object occasionally applied to this wire. The magnifiers in the slider E are mounted in a wheel case, which perhaps prevents its being in the way so much as the long slider E before described —This contrivance is represented at X, fig. 12.

4. *Martin's New Universal Compound Microscope.*—This instrument was originally constructed by the late Mr. Benjamin Martin, and intended to comprise all the uses and advantages of the single, compound, opaque, and aquatic microscopes. The following is a description of it as now made, with a few alterations, chiefly suggested (we are told) by Mr. Jones of Holborn.

Fig. 13. is a representation of the instrument placed up for use. A, B, C, D, is the body of the microscope: which consists of four parts, viz. AB the eye-piece, or that containing the eye-glasses, and is screwed into C, which is a moveable or sliding tube on the top; this inner tube contains the body-glass screwed into its lower part D is the

exterior tube or case, in which the other slides up and down in an easy and steady manner. This motion of the tube C is useful to increase or decrease the magnifying power of the body-glass when thought necessary, as before mentioned. E is a pipe or snout screwed on to the body of the microscope D, and at its lower part, over the several magnifying lenses hereafter described. FGHI is the square stem of the microscope, upon which the stage R moves in an horizontal position, upwards or downwards, by means of the fine rackwork of teeth and pinion. KL is a strong solid joint and pillar, by which the position of the instrument is readily altered from a vertical one to an oblique or to a perfectly horizontal one, as may be required: it is thus well adapted to the ease of the observer either sitting or standing; and as it is very often convenient to view objects by direct unreflected light, when the square stem FI is placed in an horizontal position for this purpose, the mirror T is then to be taken off in order to prevent the obstruction of the rays. M is a circular piece of brass, serving as a base to the pillar. NOP, the tripod or foot by which the whole body of the microscope is steadily supported; it folds up when packed into the case. W is a brass frame, that contains the condensing lens, and acts in conjunction with the large concave and plane mirrors below at T; the reflected rays from which, either of the common light or of that of a candle or lamp, it agreeably modifies, and makes steady in the field of view.

The particulars of the apparatus to this microscope are as follow: Q is a circular brass box, containing six magnifiers or object lenses, numbered 1, 2, 3, 4, 5, 6; the digits of which appear severally through a small round hole in the upper plate of it. To the upper side is fixed a small circle of brass, by which it is connected with, and screwed into, the round end of the arm *abcd;* which is a long piece of brass, and moves through either by teeth or pinion, or not, as may be desired, in *ef;* which is a socket on the upper part of the pillar, and admits, with a motion both easy and steady, the brass arm. R is a fixed stage, upon which the objects to be viewed are to be placed: it is firmly fastened to the square pillar, which is moved by the rackwork. In the middle is a large circular hole, for receiving concave glasses, with fluids, &c. it has also a sliding spring-frame to fasten down slips of glass or other things: at *abc* are three small sockets or holes, intended to receive several parts of the apparatus. S is the refractor, or illuminating lens, for converging the sun's rays upon opaque objects laid upon the stage R. To this purpose it moves on a semicircle upon a long shank *g*, in a spring socket *h*, in the arm *i;* this arm moving every way by a stout pin *k* in the socket *a* of the stage. In this manner it is easily adjusted to any position of the sun, candle, &c.—T, the reflecting-glass frame, containing a concave and plane speculum, which is moved upon the square pillar by the hand. The use of it is to illuminate all transparent objects that are applied to the stage above.

Fig. 14, plate 110, N° 1, is an auxiliary moveable stage; which by means of a pin *k* is placed in the hole *a* of the stage R, and can be moved in an horizontal direction over the whole field of the stage. In this stage there are three circular holes with shouldered bottoms: a large one in the middle, and on each side a small one, for the reception of the three following necessary articles: N° 2, a watch-glass to be placed in the large hole, to hold fluids containing animalcules, &c.; a circular piece of ivory, N° 3, one side of which is black, the other white, to support opaque objects of different contrasted colours; and circular plane and concave glasses, N° 4, for extemporaneous transparent objects.—The same use is made of the other small hole as of the large one, only in a lesser degree, to receive small concave glasses, plates, &c.

N° 5, is the silvered speculum, called a *liberkuhn*, which makes the single opaque microscope, by being screwed to the slider *abcd* (fig. 13.) instead of the box of lenses Q, and the body AE above it. The chief use of this is to view very small objects strongly illuminated near the compounded focus of the mirror T (fig. 13.) N° 6, is the forceps, or pliers, for holding such kind of objects, and by which they can be applied very readily to the focus of the lens in the liberkuhn. They have a motion all ways by means of the spring socket *a*, the joint *b*, and the shank *c:* they are placed in the socket *c* of the fixed stage R (fig. 13.) N° 7, is a small piece of ivory, to be placed upon the pointed end of the pliers; it is black upon one side, and white upon the other, to receive opaque objects.

N° 8, is a liberkuhn of a larger size than that first mentioned, with a hole in its centre: this is screwed into N° 9, the hole *a* of a brass ring, fastened to a long wire *b;* which moves up and down in the spring socket *b* of the stage R, in which it also moves sideways; and thus, with the body AE above, forms an aquatic compound microscope for showing all sorts of objects in water and other fluids placed under it in the watch-glass N° 2, on the stage.

N° 11, is a cone with a proper aperture *a* to exclude superfluous light, that would disturb a critical observation of a curious object; it is placed on the under side of the fixed stage R.

N° 12, is what is usually called a bug-box, consisting of a concave glass with a plane one screwed over it; by means of which a bug, louse, flea, &c. may be secured and viewed alive. It is to be placed on either of the stages R (fig. 13.), or N° 1, (fig. 14.)

N° 13, is the fish-pan. In the long concave body *ab*, a fish may be so confined by the ribband *c*, that the transparent tail may be in part over the slit or hole at *a*. In this state, it is placed on the stage R, with the pin *d* in the hole *c* of the stage, and moves freely and horizontally for viewing the circulation of the blood, &c.

N° 14, is the slider-holder that is placed on the stage R: it receives the sliders and tubes when filled with transparent objects, to be viewed either by the compound or single microscope.

N° 15, represents the ivory slider, to hold the objects between the talcs as usual.

N° 16, is a useful auxiliary slider framed in brass. In this slider small concave glasses are cemented; and a slip of plane glass slides over them; by which any small living object, as mites, &c. may be confined without injury, and deliberately viewed.

N° 17, represents a set of glass tubes, three in number, one within another; they are useful for small tad-poles, water-newts, eels, &c. when the circulation of the blood is to be viewed. There is a small hole at one end of each tube, that serves to admit the air; for, when they are filled with water, the other end is stopped with a cork.

N° 18, is a small ivory box, containing spare talcs and wires, to supply the sliders with occasionally.

N° 19, a brass cell or button, containing a very small lens, properly set between two small plates of brass, that it may be brought very near to the object when viewed therewith as a single microscope.

This magnifier is screwed into the same hole as the wheel of six magnifiers Q are (fig. 13.)

N° 20, is a lens, adapted to view and examine objects, by magnifying them sufficiently, so as to be able to apply them to the microscope for inspection: on this account it is called the explorator.

The preceding are the chief articles of the apparatus; which, on account of their being somewhat different from what is applied to other microscopes, we have been thus particular in describing. In using the microscope, and while viewing objects by either the single or compound instrument, the focal distances of the magnifiers are made perfectly exact by turning of the pinion at the nut *w*, in one way or the other, very gently in the teeth of the rackwork at X (fig. 13.).

It is necessary that the centres of the object lenses or magnifiers, the stage, and the mirrors at bottom, should all be in a right line in the axis of the microscope, when opaque objects are to be viewed, that are placed upon the ivory piece N° 7, or the forceps N° 6, and all other such sort of objects which are placed in the centre of the stage R, or slider-holder N° 14: but when aquatic or living objects, which require a great space to move in, are to be viewed, then the horizontal motion at *ef* (fig. 13.) is made use of, and the view may be extended laterally over the whole of the diameter of the object or field of view: and by putting the arm *abcd* forward or backward in its socket *ef*, the view is extended in the contrary direction equally well; and in this manner the whole of the objects may be viewed without the least disturbance.

As the brass arm *abcd* may be brought to the height of three or four inches above the stage R; so, by means of the rack-work motion of the stage, a lens of a greater focal distance than the greatest in the wheel Q may be occasionally applied in place of the wheel, and thereby the larger kind of objects be viewed; the instrument becoming, in this case, what is called a megalascope.

In viewing moving living objects, or even fixed ones, when nice motions are requisite, a rack-work and pinion is often applied to the arm *abcd*: the arm is cut out with teeth; and the pinion, as shown at Y, is applied to work it. This acts but in one direction; and, in order to produce an equally necessary motion perpendicular to this, rack-work and pinion is applied tangent-wise to the stage, which is then jointed.

What has been related above respects the construction of those denominated parlour microscopes, in contradistinction to those which are portable: their dimensions, however, have been considerably reduced by opticians, in order to render them fit for the pocket; and as they are for the most part constructed on nearly the same principles as those which have been already described, what has been said will sufficiently instruct our readers in using any pocket microscope whatever. Only it may be observed, that in those reduced instruments, both the field of view and the magnifying power are proportionably diminished.

III. *Of Solar Microscopes.*

This instrument, in its principle, is composed of a tube, a looking-glass or mirror, a convex lens, and Wilson's single microscope before described. See Plate 110. The sun's rays being reflected through the tube by means of the mirror upon the object, the image or picture of the object is thrown distinctly and beautifully upon a screen of white paper or a white linen sheet, placed at a proper distance to receive the same; and may be magnified to a size not to be conceived by those who have not seen it; for, the farther the screen is removed, the larger will the object appear; insomuch that a louse may thus be magnified to the length of five or six feet, or even a great deal more; though it is more distinct when not enlarged to above half that size.

The different forms in which the solar microscope is constructed are as follow:

1. The old construction is represented in fig. 21, Plate 110. A is a square wooden frame, through which pass two long screws assisted by a couple of nuts 1, 1. By these it is fastened firmly to a window-shutter, wherein a hole is made for its reception; the two nuts being let into the shutter, and made fast thereto. A circular hole is made in the middle of this frame to receive the piece of wood B, of a circular figure; whose edge, that projects a little beyond the frame, composes a shallow groove 2, wherein runs a catgut 3; which, by twisting round, and then crossing over a brass pulley 4, (the handle whereof, 5, passes through the frame), affords an easy motion for turning round the circular piece of wood B, with all the parts affixed to it. C is a brass tube, which, screwing into the middle of the circular piece of wood, becomes a case for the uncovered brass tube D to be drawn backwards or forwards in. E is a smaller tube, of about one inch in length, cemented to the end of the larger tube D. F is another brass tube, made to slide over the above described tube E; and to the end of this the microscope must be screwed when we come to use it. 5. A convex lens, whose focus is about twelve inches, designed to collect the sun's rays, and throw them more strongly upon the object. G is a looking-glass of an oblong figure, set in a wooden frame, fastened by hinges in the circular piece of wood B, and turning about therewith by means of the above-mentioned catgut. H is a jointed wire, partly brass and partly iron; the brass part whereof, 6, which is flat, being fastened to the mirror, and the iron part, 7, which is round, passing through the wooden frame, enable the observer, by putting it backwards or forwards, to elevate or depress the mirror according to the sun's altitude. There is a brass ring at the end of the jointed wire 8, whereby to manage it with the greater ease. The extremities of the cat-gut are fastened to a brass pin, by turning of which it may be braced up, if at any time it becomes too slack.

When this microscope is employed, the room must be rendered as dark as possible; for on the darkness of the room, and the brightness of the sunshine, depend the sharpness and perfection of your image. Then putting the looking glass G through the hole in your window-shutter, fasten the square frame A to the shutter by its two screws and nuts 1, 1. This done, adjust your looking-glass to the elevation and situation of the sun, by means of the jointed wire H, together with the catgut and pulley, 3, 4. For, the first of these raising or lowering the glass, and the other inclining it to either side, there results a twofold motion, which may easily be so managed as to bring the glass to a right position, that is, to make it reflect the sun's rays directly through the lens 5, upon the paper screen, and form thereon a spot of light exactly round. But though the obtaining a perfect circular spot of light upon the screen before you apply the microscope is a certain proof that your mirror is adjusted right, that proof must not always be expected; for the sun is so low in winter, that, if it shine in a direct line against the window, it cannot then afford a spot of light exactly round; but, if it be on either side, a round spot may be

obtained, even in December. As soon as this appears, screw the tube C into the brass collar provided for it in the middle of your wood-work, taking care not to alter your looking-glass: then screwing the magnifier you choose to employ to the end of your microscope in the usual manner, take away the lens at the other end thereof, and place a slider, containing the objects to be examined, between the thin brass plates, as in the other ways of using the microscope. Things being thus prepared, screw the body of the microscope over the small end E of the brass tube F; which slip over the small end E of the tube D, and pull out the said tube D less or more as your object is capable of enduring the sun's heat. Dead objects may be brought within about an inch of the focus of the convex lens 5; but the distance must be shortened for living creatures, or they will soon be killed.

If the light fall not exactly right, you may easily, by a gentle motion of the jointed wire and pulley, direct it through the axis of the microscopic lens. The short tube F, to which the microscope is screwed, renders it easy, by sliding it backwards or forwards on the other tube E, to bring the objects to their focal distance; which will be known by the sharpness and clearness of their appearance: they may also be turned round by the same means, without being in the least disordered.

The magnifiers most useful in the solar microscope are in general the fourth, fifth, or sixth. The screen on which the representations of the objects are thrown is usually composed of a sheet of the largest elephant paper, strained on a frame which slides up or down, or turns about at pleasure on a round wooden pillar, after the manner of some fire-screens. Larger screens may also be made of several sheets of the same paper pasted together on cloth, and let down from the ceiling with a roller like a large map.

"This microscope (says Mr. Baker) is the most entertaining of any; and perhaps the most capable of making discoveries in objects that are not too opaque: as it shows them much larger than can be done any other way. There are also several conveniences attending it, which no other microscope can have: for the weakest eyes may use it without the least straining or fatigue: numbers of people together may view any object at the same time; and, by pointing to the particular parts thereof, and discoursing on what lies before them, may be able better to understand one another, and more likely to find out the truth than in other microscopes, where they must peep one after another, and perhaps see the object neither in the same light nor in the same position. Those, also, who have no skill in drawing, may, by this contrivance, easily sketch out the exact figure of any object they have a mind to preserve a picture of; since they need only fasten a paper on the screen, and trace it out thereon either with a pen or pencil, as it appears before them. It is worth the while of those who are desirous of taking many draughts in this way to get a frame, wherein a sheet of paper may be put in or taken out at pleasure; for, if the paper be single, the image of an object will be seen almost as plainly on the back as on the fore-side; and, by standing behind the screen, the shade of the hand will not obstruct the light in drawing, as it must in some degree when one stands before it." This construction, however, has now become rather obsolete, and is superseded by the following.

II. *The improved Solar Microscope, as used with the improved Single Microscope, with teeth and pinion.* Fig. 22, represents the whole form of the single microscope; the parts of which are as follows: ABCD the external tube; GHIK the internal moveable one; QM part of another tube within the last, at one end of which is fixed a plate of brass hollowed in the middle, for receiving the glass tubes: there is also a moveable flat plate, between which and the fixed end of the second tube the ivory sliders are to be placed. L, a part of the microscope, containing a wire spiral spring, keeping the tube QM with its plates firm against the fixed part IK of the second tube.

EF is the small rack-work of teeth and pinion, by which the tube IG is moved gradually to or from the end AB, for adjusting the objects exactly to the focus of different lengths. NO is a brass slider, with six magnifiers; any one of which may easily be placed before the object. It is known when either of the glasses is in the centre of the eye-hole, by a small spring falling into a notch in the side of the slider made against each of the glasses. Those parts of the apparatus, fig. 14, (Pl. 109.) marked No. 15, 16, 17, 18, 19, 20, 21 and 22, are made use of here to this microscope. GH is a brass cell, which holds an illuminating glass for converging the sun's beams or the light of a candle strongly upon the objects. The aperture of the glass is made greater or less, by two circular pieces of brass, with holes of different sizes, that are screwed separately over the said lens. But, at times, objects appear best when the microscope is held up to the common light only, without this glass. It is also taken away when the microscope is applied to the apparatus now to be described.

Fig. 23, represents the apparatus with the single microscope screwed to it, which constitutes the solar microscope. AB is the inner moveable tube, to which the single microscope is screwed. CD is the external tube, containing a condensing convex glass at the end D, and is screwed into the plate EF, which is cut with teeth at its circumference, and moved by the pinion I, that is fixed with the plate GH. This plate is screwed fast against the window-shutter, or board fitted to a convenient window of a darkened room, when the instrument is used. KL is a long frame, fixed to the circular plate EF; containing a looking-glass or mirror for reflecting the solar rays through the lens in the body of the tube D. O is a brass milled head, fastened to a worm or endless screw; which on the outside turns a small wheel, by which the reflecting mirror M is moved upwards or downwards.

In using this microscope, the square frame GH is first to be screwed to the window-shutter, and the room well darkened: which is best done by cutting a round hole of the size of the moveable plate EF, that carries the reflector in the window-shutter or board; and, by means of two brass nuts *a a*, let into the shutter to receive the screws PP, when placed through the holes in the square frame GH, at the two holes QQ; which will firmly fasten the microscope to the shutter, and is easily taken away by only unscrewing the screws PP.

The white paper screen, or white cloth, to receive the images, is to be placed several feet distant from the window; which will make the representations the larger in proportion to the distance. The usual distances are from 6 to 16 feet.

The frame KL, with its mirror M, is to be moved by turning the pinion I, one way or the other, till the beams of the sun's light come through the hole into the room: then, by turning of the worm at O, the mirror must be raised or depressed

till the rays become perfectly horizontal, and go straight across the room to the screen. The tube CD, with its lens at D, is now to be screwed into the hole of the circular plate EF: by this glass the rays will be converged to a focus; and from thence proceed diverging to the screen, and there make a large circle of light. The single microscope, fig. 22. is to be screwed on to the end AB (fig. 23.) of the inner tube; and the slider NO, with either of the lenses marked 1, 2, 3, 4, 5, or 6, in the centre hole at the end AB. This will occasion a circle of light upon the screen much larger than before. The slider or glass-tube, with the objects to be viewed, is to be placed between the plates at IK against the small magnifier, and moved at pleasure. By shifting the tube AB in or out, you may place the object in such a part of the condensed rays as shall be sufficient to illuminate it, and not scorch or burn it; which will generally require the glass to be about one inch distant from the focus. It now remains only to adjust the object, or to bring it so near to the magnifier that its image formed upon the screen shall be the most distinct or perfect: and it is effected by gently turning the pinion F, fig. 22, a small matter one way or the other. If the object be rather large in size, the least magnifiers are generally used, and *vice versa*.

No. 1. is the greatest magnifier, and No. 6. the least, in the brass slider NO. But if desired, single lenses of greater magnifying powers are made: and they are applied by being screwed to the end A B, fig. 12. and the brass slider NO is then taken away.

The same object may be variously magnified by the lenses severally applied to it; and the degree of magnifying power is easily known by this rule: *As the distance of the object is to that of its image from the magnifier; so is the length or breadth of the object to that of the image.*

Instead of the brass sliders with the lenses NO, there is sometimes screwed a lens of a large size, and longer focal distance: the instrument is then converted into a megalascope; and is adapted for viewing the larger kind of objects contained in large sliders, such as is represented at R. And, in the same manner, small objects of entertainment, painted upon glass like the sliders of a magic lanthorn, are much magnified, and represented upon the same screen.

The solar microscopes just described are capable only of magnifying transparent objects; for which purpose the last instrument is extremely well adapted. But as opaque objects form the most considerable part of the curious collections in the works of art as well as nature, a solar microscope for this purpose was a long time wanted.—For several years previous to 1774, the late Mr. Martin made several essays towards the construction of such an instrument; and at last completed one about the time just mentioned, which he named,

III. *The Opaque Solar Microscope.* "With this instrument (to use his own words) all opaque objects, whether of the animal, vegetable, or mineral kingdom, may be exhibited in great perfection, in all their native beauty; the lights and shades, the prominences and cavities, and all the varieties of different hues, tints, and colours; heightened by reflection of the solar rays condensed upon them." Transparent objects are also shown with greater perfection than by the common solar microscope.

Fig. 24. represents the solar opaque microscope, ...unted for exhibiting opaque objects.

...25. is the single tooth-and-pinion microscope ... before, which is used for showing transparent objects; the cylindrical tube Y thereof being made to fit into the tube FE of the solar microscope.

ABCDEF (fig 24.) represents the body of the solar microscope; one part thereof, ABCD, is conical; the other, CDEF, is cylindrical. The cylindrical part receives the tube G of the opaque box, or the tube Y of the single microscope. At the large end AB of the conical part there is a lens to receive the rays from the mirror, and refract them towards the box HIKL. NOP is a brass frame, which is fixed to the moveable circular plate *a b c:* in this frame there is a plane mirror, to reflect the solar rays on the aforementioned lens. This mirror may be moved into the most convenient position for reflecting the light, by means of the nuts Q and R. By the nut Q it may be moved from east to west; and it may be elevated or depressed by the nut R. *d e,* Two screws to fasten the microscope to a window-shutter. The box for opaque objects is represented at HIKL: it contains a plane mirror M, for reflecting the light which it receives from the large lens to the object, and thereby illuminating it; S is a screw to adjust this mirror, or place it at a proper angle for reflecting the light. VX, two tubes of brass, one sliding within the other, the exterior one in the box HIKL; these carry the magnifying lenses: the interior tube is sometimes taken out, and the exterior one is then used by itself. Part of this tube may be seen in the plate within the box HIKL. At H there is a brass plate, the back part of which is fixed to the hollow tube *h*, in which there is a spiral wire, which keeps the plate always bearing against the side H of the brass box HIKL. The sliders, with the opaque objects, pass between this plate and the side of the box; to put them there, the plate is to be drawn back by means of the nut *g: i k* is a door to one side of the opaque box. The foregoing pieces constitute the several parts necessary for reviewing opaque objects. We shall now proceed to describe the single microscope, which is used for transparent objects: but in order to examine these, the box HIKL must be first removed, and in its place we must insert the tube Y of the single microscope that we are now going to describe.

Fig. 25. represents a large tooth-and-pinion microscope: at *m*, within the body of this microscope, are two thin plates, that are to be separated, in order to let the ivory sliders pass between them; they are pressed together by a spiral spring, which bears up the under plate, and forces it against the upper one.

The slider S (under fig. 24.), which contains the magnifiers, fits into the hole *n;* and any of the magnifiers may be placed before the object by moving the aforesaid sliders: when the magnifier is at the centre of the hole P, a small spring falls into one of the notches which is on the side of the slider.

Under the plate *m* are placed two lenses, for enlarging the field of view on the screen: the smaller of the two is fixed in a piece of brass, and is nearest the plate *m*; this is to be taken out when the magnifiers, No. 4, 5, or 6, are used, or when the megalascope lens T (fig. 24.) is used; but is to be replaced for No. 1, 2, 3.

This microscope is adjusted to the focus by turning the milled nut O.

To *use* the solar microscope:—Make a round hole in the window-shutter, a little larger than the circle *a b c;* pass the mirror ONP through this hole, and apply the square plate to the shutter; then mark

with a pencil the places which correspond to the two holes through which the screw is to pass; take away the microscope, and bore two holes at the marked places, sufficiently large to let the milled screws *de* pass through them.

The screws are to pass from the outside of the shutter, to go through it; and being then screwed into their respective holes in the square plate, they will, when screwed home, hold it fast against the inside of the shutter, and thus support the microscope.

Screw the conical tube ABCD to the circle *a b c*, and then slide the tube G of the opaque box into the cylindrical part CDEF of the body, if opaque objects are to be examined; but if they be transparent objects you mean to show, then place the tube Y within the tube CDEF.

The room is to be darkened as much as possible, that no light may enter but what passes through the body of the microscope; for on this circumstance, together with the brightness of the sunshine, the perfection and distinctness of the image in a great measure depend.

When the microscope is to be used for opaque objects, 1. Adjust the mirror NOP, so as to receive the solar rays, by means of the two finger screws or nuts, Q R; the first, Q, turns the mirror to the right or left; the second, R, raises or depresses it: this you are to do till you have reflected the sun's light through the lens at AB strongly upon a screen of white paper placed at some distance from the window, and formed thereon a round spot of light. An unexperienced observer will find it more convenient to obtain the light by forming this spot before he puts on either the opaque box or the tooth-and-pinion microscope.

Now put in the opaque box, and place the object between the plates at H; open the door *ik*, and adjust the mirror M till you have illuminated the object strongly. If you cannot effect this by the screw S, you must move the screws Q, R, in order to get the light reflected strongly from the mirror NOP, or the mirror M, without which the latter cannot illuminate the object.

The object being strongly illuminated, shut the door *ik*, and a distinct view of the object will soon be obtained on your screen, by adjusting the tubes VX, which is effected by moving them backwards or forwards.

A round spot of light cannot always be procured in northern latitudes, the altitude of the sun being often too low; neither can it be obtained when the sun is directly perpendicular to the front of the room.

As the sun is continually changing its place, it will be necessary, in order to keep his rays full upon the object, to keep them continually directed, through the axis or the instrument, by the two screws Q and R.

To view transparent objects, remove the opaque box, and insert the tube Y, fig. 25. in its place; put the slider S into its place at *n*, and the slider with the objects between the plates at *m*; then adjust the mirror NOP, as before directed by the screws Q, R, so that the light may pass through the object; regulate the focus of the magnifier by the screw O. The most pleasing magnifiers in use are the fourth and fifth.

The size of the object may be increased or diminished by altering the distance of the screen from the microscope: five or six feet is a convenient distance.

To examine transparent objects of a larger size, or to render the instrument what is usually called a megalascope, take out the slider S from its place at *n*, and screw the button T (fig. 24.) into the hole at P, fig. 25. and remove the glass which is under the plate at *m*, and regulate the light and focus agreeable to the foregoing directions.

N. B. At the end of the tube G there is a lens for increasing the density of the rays, for the purpose of burning or melting any combustible or fusible substance: this lens must be removed in most cases, lest the objects should be burnt. The intensity of the light is also varied by moving this tube backwards or forwards.

The scales of fishes afford a great variety of beautiful objects for the microscope. Some are long; others are round, square, &c. varying considerably not only in different fishes, but even in different parts of the same fish. Leeuwenhoeck supposed them to consist of an infinite number of small scales or strata, of which those next to the body of the fish are the largest. When viewed by the microscope, we find some of them ornamented with a prodigious number of concentric flutings, too near each other, and too fine to be easily enumerated. These flutings are frequently traversed by others diverging from the centre of the scale, and generally proceeding from thence in a straight line to the circumference.

For full information concerning these and other microscopical objects, the reader may consult Mr. Jones's new edition of Adams's Essays on the Microscope, where the most valuable collection that has yet appeared on the subject may be found. See also the articles ANIMALCULE, CRYSTALLIZATION, POLYPE, PLANTS, and WOOD, in the present work.

MICROSCO'PICAL. MICROSCO'PIC. *a.* (from *microscope.*) 1. Made by a microscope (*Arbuthnot*). 2. Assisted by a microscope (*Thomson*). 3. Resembling a microscope (*Pope*).

MICROTEA, in botany, a genus of the class pentandria, order digynia. Calyx five-leaved, spreading; corolless; drupe dry, coriaceous, echinate. One species, a West Indian plant with weak diffuse stem, and white minute flowers.

MID. *a.* (contracted from *middle.*) 1. Middle; equally between two extremes. 2. It is much used in composition.

MIDAS, in fabulous history, a king of Phrygia, son of Gordius or Gorgias. In consequence of the hospitality he shewed to Silenus, the preceptor of Bacchus, who had been brought to him by some peasants, he was permitted by the god to choose whatever recompence he pleased. He had the avarice to demand that whatever he touched might be turned into gold. His prayer was granted, but when the very meats which he attempted to eat became gold in his mouth, he begged Bacchus to take away so fatal a present. He was then ordered to wash himself in the river Pactolus, whose sands were turned into gold by the touch of Midas. Some time after this adventure Midas supported that Pan was superior to Apollo in singing and playing upon the flute, for which rash opinion the offended god changed his ears into those of an ass, to shew his ignorance and stupidity. This Midas attempted to conceal; but one of his servants saw the length of his ears, and opened a hole

in the earth, and after he had whispered there that Midas had the ears of an ass, he covered the place as before. On that place, as the poets mention, grew a number of reeds, which, when agitated by the wind, uttered the same sound that had been buried beneath, and published to the world that Midas had the ears of an ass.

MID-COURSE. *s.* (*mid* and *course.*) Middle of the way (*Milton*).

MI'DDAY. *a.* (*mid* and *day.*) Meridional; being at noon (*Sidney*).

MIDDAY. *s.* Noon; meridian (*Donne*).

MI'DDEST. The superl. of *mid* (*Spenser*).

MI'DDLE. *a.* (mıdꝺle, Saxon.) 1. Equally distant from the two extremes (*Swift*). 2. Intermediate; intervening (*Davies*). 3. *Middle* finger; the long finger (*Sharp*).

MI'DDLE. *s.* 1. Part equally distant from two extremities; the part remote from the verge (*Judges*). 2. The time that passes, or events that happen, between the beginning and end (*Dryden*).

MI'DDLE-AGED. *a.* (*middle* and *age.*) Placed about the middle of life (*Swift.*)

MI'DDLEMOST. *a.* (from *middle.*) Being in the middle (*Newton*).

MI'DDLING. *a.* (from *middle.*) 1. Of middle rank; of condition equally remote from high and low (*L'Estrange*). 2. Of moderate size; having moderate qualities of any kind (*Graunt*).

MIDDLEBURG, a large and strong commercial city of the United Provinces, capital of the island of Walcheren, and of all Zealand. The squares and public buildings are magnificent. The Dutch took it from the Spaniards in 1574, after a siege of 22 months. The English took it from the Dutch in the summer of 1809; but soon abandoned it. The inhabitants are computed at 26,000. The harbour is large and commodious, and has a communication with the sea by a canal, which will bear the largest vessels. It is 20 miles N.E. of Bruges, 30 N.W. of Ghent, and 72 S.W. of Amsterdam. Lon. 3. 39 E. Lat. 51. 32 N.

MIDDLEBURG, a town of Dutch Flanders, which belongs to the prince of Issenghein. It is five miles S.E. of Sluys. Lon. 3. 26 E. Lat. 51. 15 N.

MIDDLEBURG. See EAOOWE.

MIDDLEHAM, a town of England, in the North-riding of the county of York, with a weekly market on Monday: twenty-six miles NW. Boroughbridge, and 229 N. London.

MIDDLESEX, a county of England, bounded on the north by Hertfordshire, on the east by Essex, from which it is separated by the river Lea, on the south by Surrey, and a small part of Kent, from both which it is separated by the river Thames, and on the west by Buckinghamshire, from which it is separated by the river Coln and a small part of Surrey, about twenty-four miles in length, and about fourteen in breadth. It is divided into six hundreds, and contains two cities, London and Westminster, seven market towns, and about 200 parishes, without including those in the cities. This county, although one of the smallest, is the richest and most populous in the kingdom. The soil in general is loamy, in some places tending to gravel, in some to clay, in others to sand; in the neighbourhood of London, where manure is easily to be obtained, the land is mostly employed in gardens and nurseries, or laid down to grass. At a farther distance, especially towards Buckinghamshire, there are some considerable tracts of arable land, which produce good crops of corn. There are some very extensive meadows on the side of the rivers Thames, Lea, and Coln. The number of cows kept by the London cow-keepers, for the supply of the metropolis with milk in the county of Middlesex, is about 7200, besides 1300 kept on the other side of the Thames, in Surrey and Kent; each of these cows is supposed to produce eight quarts of milk a day, on an average. The towns are Barnet, Brentford, Edgeware, Enfield, Hounslow, Stanes and Uxbridge. Middlesex sends eight members to the British parliament, that is, two for the county, four for London, and two for Westminster.

MIDDLESEX, a county of United America, in the state of Massachusetts.

MIDDLETON (sir Hugh), an English projector, was a native of Denbigh in North Wales, and a citizen of London. He undertook to conduct the New River, consisting of the union of two streams in Middlesex and Hertfordshire, to London, which work was begun in 1608. In this great scheme he spent his whole fortune, and impoverished himself. James I. who greatly patronized the plan, conferred on him the honour of knighthood. He died in the reign of Charles I.

MIDDLETON (Conyers), a famous English divine, was the son of a clergyman, and born at York in 1683. He was bred at Trinity college, Cambridge, of which he was chosen fellow in 1706. In 1717 he was created D.D. by mandamus, on which occasion happened the famous law-suit with Dr. Bentley, respecting his right to fees. Of this affair Dr. Middleton, who was a zealous stickler against Bentley, published an account. He afterwards attacked that learned critic's proposals for a new edition of the Greek Testament in such a manner, that the design was laid aside. In 1724 Middleton travelled to Italy, which occasioned his well-known letter from Rome, shewing the exact conformity between popery and paganism. In 1730 he published a letter to Dr. Waterland, containing remarks on his Vindication of Scripture, which was attacked by Dr. Pearce and others, who charged Middleton with being an infidel in disguise, and he had some difficulty to escape academical censures. The year following he was appointed Woodwardian professor, but resigned the place in 1734. In 1735 he published a Dissertation concerning the Origin of Printing in England, 4to. In 1741 appeared his capital performance, the History of the Life of M.

Tullius Cicero, in 2 vols. 4to.; perhaps one of the completest pieces of biography ever written. In 1743 he published the Epistles of Cicero to M. Brutus, and those of Brutus to Cicero, in Latin and English, with a vindication of their authenticity. In 1747 he printed a work which produced a flaming controversy; it was entitled, A Discourse concerning the Miraculous Powers which are supposed to have subsisted in the Christian Church from the earliest Ages. This performance gave great alarm to the clergy, and to many serious Christians of all denominations; and numerous answers were published to it. He died in 1750; and in 1752 appeared all his works, except the Life of Cicero, in 4 vols. 4to.

MIDDLETON, a commercial town of the state of Connecticut, seated on the river Connecticut, 15 miles S. of Hartford. It is one of the county towns of Middlesex.

MIDDLETOWN, a town of the state of New Jersey, and adjoining Shrewsbury, in the county of Monmouth. Sandy Hook (so called from its shape and soil) is included in this township. On the point of the Hook stands the light-house, 100 feet high, built by the city of New York. Middletown is 30 miles S.W. of New York, and 50 E. by N. of Trenton.

MIDDLEWICH, a town of Cheshire, 167 miles from London. It stands near the conflux of the Croke and Dan, where are two salt-water springs, from which are made great quantities of salt, the brine being said to be so strong as to produce a full fourth part salt. It is an ancient borough, governed by burgesses; and its parish extends into many adjacent townships. It has a spacious church. Its market is on Tuesdays; and fairs on St. James's day, July 25, and Holy-Thursday. By the late inland navigation, it has communication with the rivers Mersey, Dee, Ribble, Ouse, Trent, Darwent, Severn, Humber, Thames, Avon, &c. which navigation, including its windings, extends above 500 miles, in the counties of Lincoln, Nottingham, York, Lancaster, Westmoreland, Stafford, Warwick, Leicester, Oxford, Worcester, &c. The river Wheelock, after a course of about 12 miles from Mow-cop-hill, runs into the Dan a little above this town.

MIDGE. *s.* (mıcʒe, Saxon.) A gnat.

MID-HEAVEN. *s.* (*mid* and *heaven.*) The middle of the sky (*Milton*).

MIDHURST, a town of Sussex, 52 miles from London, has been represented in parliament ever since the 4th of Edward II. It is a neat small town, on a hill surrounded with others, having the river Arun at the bottom; and is a borough by prescription, governed by a bailiff, chosen annually by a jury at a court-leet of the lord of the manor. The market is on Thursday; fairs on March [illegible], and the Thursday after.

MIDIAN, or MADIAN (anc. geog.), a town on the south side of Arabia Petræa; so called from one of the sons of Abraham by Keturah.—Another Midian, near the Arnon and Æoplis, in ruins in Jerome's time. With the daughters of these Midianites the Israelites committed fornication, and were guilty of idolatry.

MI'DLAND. *a.* (*mid* and *land.*) 1. That is remote from the coast (*Hale*). 2. Surrounded by land; mediterranean (*Dryden*).

MI'DLEG. *s.* (*mid* and *leg.*) Middle of the leg (*Bacon*).

MID-LOTHIAN. See LOTHIAN.

MI'DMOST. *a.* (from *mid.*) Middle.

MI'DNIGHT. *s.* (*mid* and *night.*) The noon of night; the depth of night; twelve at night (*Atterbury*).

MI'DNIGHT. *a.* Being in the middle of the night (*Bacon*).

MID-RIB, in botany, the main nerve or middle rib of the leaf, running from the base or petiole to the apex, and from which the veins of the leaf usually arise and spread. See RACHIS, and RIB.

MI'DRIFF. *s.* (mıdhpıre, Saxon.) The diaphragm (*Milton.*)

MID-SEA. *s.* The Mediterranean sea (*Dryden*).

MIDSHIP-FRAME, a name given to that timber, or combination of pieces formed into one timber, which determines the extreme breadth of the ship, as well as the figure and dimension of all the inferior timbers.

MIDSHIPMAN, a sort of naval cadet, appointed by the captain of a ship of war to second the orders of the superior officers, and assist in the necessary business of the vessel, either aboard or ashore.

The number of midshipmen, like that of several other officers, is always in proportion to the size of the ship to which they belong. Thus a first-rate man of war has 24, and the inferior rates a suitable number in proportion. No person can be appointed lieutenant without having previously served two years in the royal navy in this capacity, or in that of mate, besides having been at least four years in actual service at sea, either in merchant-ships or in the royal navy.

Midshipman is accordingly the station in which a young volunteer is trained in the several exercises necessary to attain a sufficient knowledge of the machinery, movements, and military operations of a ship, to qualify him for a sea officer.

MIDST. *s.* Middle (*Taylor*).

MIDST. *a.* (from *middest.*) Midmost; being in the middle (*Dryden*).

MIDSTRE'AM. *s.* (*mid* and *stream.*) Middle of the stream (*Dryden*).

MI'DSUMMER. *s.* (*mid* and *summer.*) The summer solstice (*Swift*).

MI'DWAY. *s.* (*mid* and *way.*) The part of the way equally distant from the beginning and end (*Shakspeare*).

MI'DWAY. *a.* Being in the middle between two places (*Shakspeare*).

MI'DWAY. *ad.* In the middle of the passage (*Dryden*).

MI'DWIFE. *s.* (mið *and* pif, Sax.) A woman who assists women in childbirth (*Donne*).

MIDWIFERY. (by Skinner and Junius derived from mið, or meed, a reward, and pif, a wife, Sax. literally, therefore, wife-fee.) In a more rigid sense the art or science of assisting women in child-birth; but in a larger sense, and as it is now more generally professed, lectured upon, and practised, the art or science of assisting females in every affection connected with the sexual system, and infants during the period of lactation.

Such, therefore, being the general signification assigned to the term in the present day, we shall contemplate it under this sense in the following sketch of its rise, progress, and practice; availing ourselves of the observations the writer of this article has already offered to the public upon the same subject in a similar work of high respectability published about two years since, and which he is happy to find have met with much general approbation.

History.

The history of midwifery may be comprised in a few words. In the earliest ages of the world, when the manners were simple, the hours of rest and food regular, and the general strength and health proportionate, it was only in cases of mal-conformation either of the mother or of the child, or mispresentation of the latter, that any other assistance, perhaps, than what nature herself either gave or indicated could be demanded. These cases, even in the present day of luxury, complex manners, and delicate health, are, upon the whole, extremely few, compared with the general average of births that every hour is a witness to. Yet in the periods we are now contemplating, we know that they must have been very considerably fewer, because we know that in every instance in which society, by its natural tendency, has overstepped the just medium of its prime object, and introduced soft and delicate habits, capricious fashions, and all the luxuries of refined life, it has at the same time introduced debility even from birth, and often before birth; and, consequently, all those mal-conformations and obliquities from the line of health which naturally belong to mankind of both sexes, and which it is their own fault (we mean the fault of themselves or their ancestors) that they do not equally possess in every generation.

Hence the art of midwifery is coeval with civilized life, and is to be measured by its advance to the utmost summit of refinement. In the earliest ages, when nature required nothing more than mere co-operation with her common efforts, women alone, and those of no peculiar degree of skill, must have been altogether competent to the business of child-birth: and hence the midwives of the Hebrews, of the Greeks, and Romans, we have reason to believe were all females. Nor do we meet with a single instance of a chirurgical or medical practitioner having been had recourse to and actually employed earlier than the middle of the seventeenth century, perhaps, among the earliest practitioners on the continent, by M. Julian Clement, a surgeon of high reputation at Paris, who attended in a difficult case Madame de la Valiere, in 1663; and Dr. William Harvey in our own country, who published his celebrated treatise on generation a few years antecedently, and a few years afterwards engaged in the practice of midwifery, and followed up his practice with his Exercitatio de Partu.

There can be no doubt that midwifery ought to have been studied and practised scientifically many ages before the period at which we have now arrived, and that thousands of lives, as well of mothers as of children, must have fallen a sacrifice to the want of anatomical skill and knowledge upon this subject. Luxury, extravagance, and dissipation were as common at Athens and Rome, during some periods of their history, as they have been in any part of Europe during the last two centuries; and though it is probable the Athenian and Roman matrons did not, from the fashion of their respective æras, run quite so readily as the ladies of the present day into all the excesses of the men, yet there can be no doubt that the example was contagious, and that the result in regard to debility of frame, and consequently occasional malconformation of organs, if not equal in point of frequency and degree, could not have essentially varied. And in reality, had the Greek and Roman ladies been as correct and regular as possible in their own lives, yet from the necessity they must have been too frequently under of intermarrying with men of far less correctness and regularity, the female offspring hence ensuing could not fail to inherit much of the same kind of delicacy and debility of frame, and consequently misproportion of construction, which we too frequently witness in the present day.

Still, however, it was the fashion to employ women, and none but women, in the momentous process of childbirth, notwithstanding the necessity of a contrary practice. Natural modesty, not always in league with fashion, gave additional force to the general custom; and imperious as was the call for the occasional employment of persons who had been regularly taught at the schools of anatomy, and had hence acquired a scientific knowledge of the organs concerned in gestation and labour, and of the changes they undergo during these respective processes,—life was in general rather to be sacrificed than a male practitioner of surgery to be resorted to. That the call for such assistance was imperious, we could adduce a thousand instances to prove, if it were necessary; we shall only observe that Agnodice, a scholar of Hierophilus, in order to acquire a knowledge of this branch of anatomy, and finding herself prohibited, either by the common law of custom, or the written law of the state, from acquiring such knowledge in her own sex, consented to assume a male appearance, and for this purpose cut off her hair, exchanged her female for male attire, and in this disguise attended the lectures of this celebrated physician. She then publicly entered upon her profession; but another difficulty occurred to her, which was, that from the dress and appearance she had so long assumed, she was still suspected to be a man, notwithstanding she had returned to the common dress of her sex; and it was long before the prejudice thus excited was completely overcome.

On these accounts the art of midwifery made less improvement than any other branch of medicine. Hippocrates says but little upon the subject, and that little but very little to the purpose. He appears to have known of no other method of delivery than by a presentation of the child's head; if any other part presented, he advises such part to be turned, and this not by an introduction of the hand of the practitioner into the uterus, but by shaking

the mother, by making her jump repeatedly, or by rolling her on her bed, and if this do not succeed, to destroy the child and deliver it piece-meal. In the writings of Celsus, however, who flourished during the reign of Tiberius, we find hints that prove some advance had been made towards a more humane, scientific, and successful practice; for we are here told, that children may be safely and easily delivered in presentations of the feet as well as of the head, by taking hold of the legs and dragging them downwards: as also that if any other parts present than the head or feet, the child must be turned in the uterus by the introduction of the assistant's hand, so that one or the other of these organs be brought forwards into the vagina. We also meet with another piece of advice which we are sorry to perceive has been of so long standing in the world, and which is very injudiciously praised and practised in the present day, and that is, that the practitioner ought to be perpetually striving to dilate the *os tincæ*, or orifice of the womb, by the introduction of the fore-finger alone, when the opening is only large enough to admit a single finger, smeared over with lard or pomatum, and that he should continue progressively to introduce two, three, and, at length, the whole hand, as a general dilater to the orifice, so that the head or whatever other part of the child presents, may the more readily pass through. Now it is comparatively very seldom that any benefit can be derived from this perpetual tampering; in some few cases of relaxed uteri, where the orifice is already sufficiently enlarged to allow three or four fingers to enter at once, and the pains at the same time are but feeble, or at least have but a small propulsive power, some advantage may be obtained, but none in any instance when the orifice is not large enough to admit of more than a single finger; while in every such attempt, provided the uterus be rigid and unpliable, instead of facilitating the enlargement, the practitioner will considerably obstruct it, his perpetual stimulus continually thickening and indurating the edges of the orifice.

Yet delivering by the feet appears by no means to have been approved by the profession in general. Celsus, though an admirably informed man, and an excellent writer, was not of the profession, while Galen, who was of it, condemned the practice as decidedly as Hippocrates. In reality we meet with the same kind of general condemnation as late as to the middle of the seventeenth century; for Riverius censured it publicly in 1657, and though Mauricean inclined to it in his own practice, as he informs us in his treatise on midwifery, published in 1664, he tells us at the same time that many authors were of opinion, that in all foot-cases it would be better to attempt to turn the child than to deliver with such a presentation. So slow is the world to shake off a prejudice of any kind when once deeply rooted, however unfounded or even fatal.

About this period several tracts or treatises on midwifery in Great Britain issued from the pens of Wharton, Charleton, Mayow, and Raynold, of all which the last appears to have been the most celebrated writer. To the instrument called the crotchet, which had been long in use, but most commonly for removing the mangled limbs of a child whom it was thought necessary to destroy, we now find added, generally supposed to have been an invention of Chamberlen, a *forceps* of a peculiar kind, having a near resemblance to what is now denominated a *vectis*:—the employment of male practitioners grew common, books of real science, and containing information of the most valuable description, issued freely from the press, and especially from the labours of Chamberlen, Willoughby, Bamber, and Simpson; lectures of reputation upon the subject of midwifery were instituted, and largely attended, a variety of ingenious instruments were devised and multiplied, and the first public description of the modern *forceps* was given by Chapman, the second public teacher of midwifery in London, which made its appearance in the third volume of the Edinburgh Medical Essays. It is useless to pursue this narrative any farther: the names of Smellie, Hamilton, Orme, and Denman, are known to every one; and their instructions have been widely felt and duly appreciated, not only by the profession, but by the world at large.

Diseases of the female sexual system. From a cause that has never yet been explained, women on the commencement of puberty throw forth at monthly intervals a peculiar and coloured fluid from the uterus, which terms of discharge only cease, or only should cease, during pregnancy, and lactation, till the age of about forty-five in this country, and others of similar warmth, though the age at which it ceases is much earlier in countries of greater heat, and where the general form acquires a much earlier maturity. At the commencement of this natural or regular flow which is usually denominated menses or menstruation, women are often subject to many diseases from the change that takes place in the constitution at that period: they are subject to other diseases from a morbid suppression, or too large or too frequent an evacuation of this discharge; and again to others, at the period of their final cessation.

We shall first examine into the nature of the menstrual fluid itself. It was formerly supposed that this fluid was a kind of surplus blood thrown out of the system from the mouths of minute veins. It has been clearly ascertained, however, by Dr. W. Hunter that this fluid, whatever it is, is thrown from the mouths not of the uterine veins, but the uterine arteries; and that instead of being blood, it has scarcely any one property in common with blood, excepting indeed in its colour. Generally speaking, the average time the discharge continues is three or four days; and as to the proportional quantity lost on each day, on the first, and fourth, or third day, the woman loses a fourth of the whole quantity each day, and, on the middle day, about the other half. The quantity lost will generally be three or four ounces altogether, a single ounce on the first day, two on the second, and the fourth and last ounce on the third day. There is nothing, however, more affected by the climate than this: in a warm climate the quantity being increased, while it is diminished in cold ones. Linnéus, while writing his account of Lapland, says, that the quantity lost there is never above half an ounce or an ounce. In hot islands, as in those of the Archipelago, Hippocrates writes, that the women lost twenty ounces of blood by this evacuation. Artificial warmth promotes the menstrual flux as powerfully as that of the sun.

The discharge, as we have already observed, commences with puberty, which varies exceedingly from climate.

In Persia the females are fit for all the purposes of women at ten years old. In Lapland not till twenty. In our country about sixteen; and this period is characterized by certain attendant circumstances: the age of puberty is evinced by hair growing on the pubes and in the axilla; the breasts

are formed and made perfect; there is also a change in the ovaria.

The discharge when it first appears is not at first red, generally it is without colour. The succeeding periods are very regular, being every month, unless the woman lives in a state of nature, and falls with child, when, upon a pretty accurate calculation, she will menstruate about once in twenty months, if she suckles. Menstruation having begun will go on regularly unless interrupted by disease, or pregnancy, for a great number of years, generally till between the fortieth and fiftieth year; and the time of its cessation is generally regulated by the age at which it commenced. The final cessation of the menses may be known to be going by certain irregularities in the appearance: instead of the discharge lasting three, it will continue for ten days; nothing will then be seen for two months; next they may come once a fortnight, and then profusely.

Menstruation appears to be a discharge intended to preserve the uterus in a state fitted for conception, for a girl cannot conceive till after the menses have appeared; nor does any woman conceive after they have ceased to flow. So that women only can become pregnant while the menses continue; and they appear to be more susceptible of conception immediately before and directly after them than at any other part of the month. Also, in all animals there is a discharge somewhat analogous to it, which in them is called heat. This state is very nearly allied to it; and is well understood by boys, not one of whom when buying a doe rabbit will pay half the price for it, if not in heat, as if she is in heat · he has nothing to do, but by pressing with his thumb to invert a portion of the vagina, and if it is red and covered thickly with blood vessels, he knows it indicates heat, and is what he looks for; but if the vagina be smooth and white, any boy knows that he must keep that rabbit on bran and other expensive provision for a month, before she will take the buck.

Menstruation may be the subject of disease from irregularity, obstruction, excess, or painful extrusion.

Irregular Menstruation.—This may regard its time of accession or cessation. It may be irregular in its monthly return, or as to the quantity of fluid lost at each period; it may arise too early in life, or continue too late. The first consideration is, where it arises too early in life; perhaps, however, there is no such thing as menstruation beginning too early in life, except as connected with a complaint. It may arise from too great strength of constitution and vascular action; from increased fullness of vessels, depending on too large a quantity of animal food, for the wear and tear of the constitution. There is a full face; a full pulse; throbbing in the head; the breasts are full, with a warm imagination. This secretion arises properly at sixteen; but here it begins at twelve or thirteen. As in this case it arises from too much blood, we should take some away; prescribe purges and strong exercise; but the medicine must be chosen. Rhubarb, jalap, senna, colocynth, and aloes, are not calculated to diminish the quantity of blood; they only increase the peristaltic motion of the intestines. Saline purgatives should be preferred, and a spare diet must be insisted upon.

The other state of the menses is, where they stay too late; this is more common than the preceding affection, and more especially in large towns. It occurs where there is too little blood, and the uterus is not in a state fit for conception. The pulse is weak, the appetite disordered, the countenance pale, the constitution below par in point of strength. We will now consider both the states just described. The first will be liable to sudden inflammation of the lungs, and has that state of body which predisposes to what is called a galloping consumption. The other will generally be more or less a scrophulous habit, disposed to go into a decline, or slow consumption. Here the mode of treatment adopted in chlorosis may be superadded to that for the restoring health by sea-bathing, if the lungs are not any way affected, and the stomach in good order, but not where there is a weak stomach or oppressed respiration.

Of Amenorrhœa, or obstructed menstruation, there are two kinds; one the acute, or accidental; the other the chronic. The acute, or accidental, arises where there is perfect health up to the time of menstruating, and the patient takes cold at the point of discharge, or even while menstruating, and the flow is prevented or suddenly ceases.

Obstructed menstruation generally depends upon the application of cold; this will produce a fever which will stop it if coming on, and arrest its progress, where it has already commenced. In all such cases, there is pain in the head, back, and loins, pain in the limbs, with all the symptoms marking fever. If we know of this early, we may with ease give relief. We may always take blood, and clear the bowels: rhubarb is the best medicine; then a saline draught, with antimonials in such quantity as to come short of vomiting, and five or six drops of laudanum, or four or five grains of ipecacuanha every six hours. The warm bath is productive of advantage where applied soon after the complaint has begun. Where the slipper bath is not at hand, the lower part of the body may be seated in a volume of tepid water in a large tub, or the convenient vehicle called a hip bath, after which the patient must be made very dry, and put into a warm bed, and use the remedies before mentioned; and the discharge will return, or, if not immediately, it will ultimately return, and the health remain unimpaired: but, if the menstruating period is passed over, it then becomes a chronic obstruction, the symptoms attending which are very destructive of female health.

Of the chronic obstruction of menstruation there are also two kinds, which have each a distinct set of symptoms; those of plethora, and those of weakness; and chronic obstruction, depending on plethora, may degenerate into that kind depending on weakness. The patient will first be taken with symptoms which only belong to plethora, and after that arise those belonging to weakness. The young are most liable to the first kind, in whom the quantity of blood is much increased beyond what it should be, by luxurious habits, and where too little exercise is taken for the quantity of food; and even here it will not often lead to obstruction, unless the occasional cause is applied by taking cold: when this does really happen, the attack of fever may be so slight as not to be observed by the patient. Where we see all the signs of the system being loaded with blood, we should certainly take some away: where the pulse is hard, full, strong, and frequent; the skin dry and hot, more thirst than there should be, with pain in the head, back, and loins; where, especially, instead of an active disposition, we see a desire to be always by the fire, and the girl at the same time liable to giddiness. Here the pulse is rarely up to 100, which being an increase of more than twenty beats in every minute, the effects of such increased action is, that

the strength will be worn out, and the chronic obstruction from plethora be changed into the chronic obstruction from weakness; the reason is this, that the action is so strong, that it may, by continuing, exhaust the powers of life: nothing indeed exhausts the strength of the system so much as increased action of the heart and arteries; for it is not the pulsating arteries alone that are affected, but in the same proportion is the action of all the capillary vessels in the body increased, so that the whole extent of increased action is prodigious. It being known that the action arising from obstructed menstruation with plethora brings on weakness, it might be expected that the strength of action would be brought gradually down to the point of health: but that never happens; it sinks below it. This sort of obstructed menstruation must be treated by evacuation, by bleeding; but the foot is not preferable, as we do not get blood enough by opening the vena saphena, unless the foot be immersed in warm water; and if this be done, we are unable to tell the quantity we take, unless we from time to time measure the water. The best way, then, is to bleed from the arm, and with bleeding to use purgative medicines: the patient should take much exercise and little sleep, and, on the intermediate day to those on which we give the purgatives, we should give a saline draught. The effect of this will be, that she will be brought down from great and morbid action to the state of health, and it is fifty to one but the menstrual discharge returns immediately.

This species of chronic obstruction proceeds from plethora: and plethora may exist so as to prevent menstruation, either at its earliest effort, or after it has been long in the regular habit of recurring. The term chlorosis is generally applied to the first kind; amenorrhœa to the second: but chlorosis, or green-sickness, is a mere result, and may result from either: it is that chronic menstruation depending on symptoms of weakness we have already noticed, and may result from each as well as from a distinct and separate source, because the continued action of vessels exhausts the strength. Usually however the complaint depends on improper food, living in bad air, or want of exercise, and, added to these, want of communication between the sexes; for a certain state of the ovaria predisposes to it. One symptom in this kind of obstructed menstruation is, there being a mark perceived round the ancle at night where the edge of the shoe came: another is, a fullness and puffiness of the face and eyelids in the morning; so that, after sleep, the whole countenance looks too big; but in the course of the day, this size and appearance goes entirely off. These last effects are evidently those of oedema, because during the day the water lodged in the cellular substance about the face subsides, and the cells below are progressively filled; so that by night the ancles are swelled: during the night again, the gravitation of the fluids diffuses the appearance of swelling over the face.

The upper extremities partake at last in this appearance, becoming swelled about the hands at night. In short, the whole skin is swoln and stretched, and assumes a soft pappy feel. To these symptoms there is now added a very great derangement of stomach, the appetite goes quite away; sometimes the patient has an inclination for improper food, a vehement fondness for cinders, candles, or pipe clay; this does not seem to belong to any sort of instinctive impulse from nature, but depends on a derangement of stomach alone: all these evidences are further proved by flatulency and a sense of weight at the stomach after eating; great irregularity of the intestines, sometimes costive, and at others lax; vegetables undergoing their acid fermentation, and animal matter its putrefaction; both known by eructations, both dependant on the impaired state of the stomach: to these succeed difficult respiration, either on walking or going up stairs; and this does not arise from ordinary weakness where a person could rest, because she was tired; but in chlorosis she stops because she loses her breath: with this there is palpitation at the heart; the pulse is frequent, small, and hard; and there are hysterical symptoms, very often, where the obstruction has been of long continuance. This complaint however is easily cured where it has been of short duration, and the menstruation is not permanently interrupted.

The treatment will depend on the form which all the symptoms take on when combined. Though cases of this obstruction differ from ordinary weakness, yet the treatment we should pursue will be applicable to most cases of weakness. It is right to keep the bowels clear, by an occasional dose of rhubarb; we should then begin the use of bitter medicines, remembering that in proportion as the weakness is greater, the medicine should be weak; for it is an error to suppose that the stronger a medicine of this kind is, the more efficacious it must be. In all cases of weakness, we must consider the lightest bitters as the most proper; at first, a dram of bitter tincture to an ounce and a half of peppermint water; or an ounce of the bitter infusion instead of the tincture. But at the same time we must recollect, that the stomach is still a weakened organ: the powers of digestion must be still weak, consequently digestion will not be so quick, nor will the food be pushed forward from the stomach so soon as it is in health; and the second meal will be ill digested, because the whole of the first has not left the stomach; for these reasons, a gentle purgative must be joined with the food. A good medicine is bitter pills, formed with such materials as will allow the stomach to act on them without much difficulty. Of all medicines, bark is the worst here; it requires a good stomach to digest it; it increases any difficulty of breathing, that may have existed previous to its use. Now and then a gentle emetic will be useful; we may for that purpose give five grains of ipecacuanha every half hour till it operates. After the bitters have impaired the tone of the stomach, this gentle action will restore its strength, and render them as efficacious as before: when the stomach is strong enough, we may begin with steel, the best form of which is called Griffiths's draughts, but it is the most nauseous mixture that ever was made as originally prescribed, and we should therefore prefer some one of the numerous modes in which this medicine has of late years been revised. By these means the weak patient will be raised up to that state which is nearest health; while the plethoric patient is lowered down to the same point. These two patients being now brought to that same point which is most favourable to menstruation, it remains to discover the best means of getting back the secretion. Having brought down the plethoric, and raised the low and weak patient, so that both are on a par, we may now begin with the emmenagogue remedies.

All these medicines called emmenagogues are

stimulating; we must never use strong stimuli where the constitution is yet weak, or we shall only exhaust the system, and where there is a tendency to plethora, we shall produce hœmoptoe: these, then, must not be begun upon till the constitution is amended. Some employ hellebore, which has sometimes certainly evinced its powers, for which reason we may give forty drops of the tincture, though most commonly the menses will return without giving any thing. Madder is recommended from its supposed deobstruent quality. Instances of its wonderful powers are related in Dr. Homes's practice. Now and then electricity has been useful, when the patient all but menstruates. Friction of the lower extremities is good as exercise. Issues have been recommended; dancing, air, and exercise, are the real, the natural, and only effectual remedies. It is merely necessary to determine to the part; we well know that a mother, directly as she takes the child in her arms, feels the draught of the milk come into the breast, even before the child is put to it.

Profuse Menstruation.—We now proceed to consider the opposite state to obstructed menstruation, which is profuse menstruation, or menorrhagia; this is where it returns too often, though there may not be too much lost in each time; or, it may be, there is twice the quantity lost at the regular time: in short, in whatever manner the secretion is increased, so as to weaken the constitution, it forms menorrhagia. Whether there be too much or too little tone in the vessels, they may be inactive; allowing their contents to escape as they do in petechial fever, both into the cellular membrane and into the urine.

Profuse menstruation may depend on increased action of the heart and arteries; or on too much food, drink, or stimuli in any shape. And the symptoms which appear in the constitution from such causes will be just those of plethora; stuffing of the chest, heat and thirst, concurring with this profuse menstruation; and the same treatment of the constitution will remove it: this is the simplest sort of menorrhagia, and requires least discussion. We must prohibit the use of animal food, and keep the bowels in a state of purging with Epsom salts. What we want is not a violent purging, but a gentle increased action of the bowels; by this we pall the appetite, which is another object gained; and it does not allow the food to remain so long in the stomach, while part of the circulating fluids is evacuated by the increased secretion we have produced into the intestines. If this treatment be not sufficient, it will be necessary to apply those local remedies prescribed in floodings.

The next state of increased menstruation is, from relaxation of the system. This will sometimes arise from increased action, which we have said will occasionally degenerate into a weakened state; for the effect of great action is the production of great weakness. Where there is a weak pulse, flabbiness of muscles, and all the symptoms of weakness and relaxation of vessels, a very small force of action in the heart will be equal to the forcing of blood through an open vessel. All the strengthening medicines as well as astringents will be necessary here; alum and bitters: and where there is nothing of a vibrating feel in the pulse, steel may be given. But, sometimes, when the profuse discharge depends on relaxation of vessels, steel will increase the discharge; yet, where there is no fever, it is one of the best remedies. Next comes the cold bath, and moderate exercise in a pure air. In regard to steel, it must be given very gradually at first, as in the mineral waters which are so famous. The stomach will frequently not bear it less diluted. It is very beneficial to recommend patients to some mineral spring in the country, even from a secondary desire to get them out of town, where they may get up early, and enjoy the benefit of a country air. The patient goes with hope and expectation of relief; her mind is amused, and her health impaired by drinking the water, though in the water there should be no virtue all.

The next sort of menorrhagia does not depend on general, but local weakness; arising from the woman having borne a great number of children, and the weakened state of the uterus. This effect is sometimes dependant on excessive venery, hence we account for the violent attacks of menorrhagia prostitutes are very subject to. It may arise from blows on the abdomen. This is a more unmanageable case than the others; because the weakness is local, and any strengthening remedies applied constitutionally increase the strength of both parts at the same time; so that there still is the same difference between the system and the uterus in point of tone, because they are both equally raised: injecting cold and astringent solutions into the vagina is the best remedy. Though now and then a case occurs, in which the opposite means succeed, where every cold application has failed, and throwing up tepid water has put a stop to it.

The worst state of relaxed uterine system is, a great local weakness of the uterine vessels, which cannot be acted upon through the medium of the constitution. Since the hemorrhage will be increased by whatever increases the strength of action in the heart and arteries, it would be more an object to lower the constitution; and the best measure is, to leave it altogether, only attempting to stop the hemorrhage by local means. But the cold application, so often recommended, will fail; a piece of ice has been in the vagina a whole day without stopping it. In these cases, the most likely thing to succeed is, to introduce an injection into the uterus itself; to do which, a tube must be carefully passed up into the uterus, like a male catheter. We must withdraw the wire from the tube, and insert the nose of a small syringe into the tube, and press forward a little of the astringent injection; as soon as it produces pain in the back, the pipe must be taken away, because a very little of the solution will be enough; if there be thirty drops in the uterus, it is quite sufficient. In the very worst case that has been known to happen, this method was completely effectual in the cure.

Dysmenorrhœa, or *Painful Menstruation.*—Painful menstruation is a complaint in a state of nature unknown; but it happens among those who do not marry at the time of life nature intended; for which there are many reasons in the present day, and among the rest the difficulty of maintaining a large family: consequently women are thrown out of a state of nature, not doing that which nature intended. The patient, when first attacked with this disease, feels hardly any pain, or if she feel pain, it is only very slight in the lower part of the back, which is from the consent of certain nerves with the uterus; but in four or five years, it becomes established pain in the back as violent as grinding pains

in labour. Such a woman will afterwards bear labour very well, and declare that she would rather bear a child than experience the pain of difficult menstruation once a month.

In this manner the pain increases, but the menstruation goes on very imperfectly, for some time; and when at length it becomes more plentiful in quantity, the pain lessens, and the last two days of the secretion is not attended with any pain.

The appearance of the fluid in this disease is not that of menstruation, as it usually occurs. There are coagula of various sizes, and if what is discharged be examined carefully, flakes of coagulable lymph will be perceived. This state arises from interruption of the functions of the uterus, and it is a situation in which the uterus is much less liable to become impregnated; but if it do, the patient may go on to menstruate without any pain to the end of her life, or perhaps with less than she suffered before. This complaint is more frequent in large towns than in the country.

The first object in regard to treatment is to remove the inflammation, for there can be no difficulty in supposing inflammation present at the time the pain is so violent: one strong proof of which is the coagulable lymph being thrown out. The patient for this purpose should leave off animal food entirely, if possible, at least partially; should avoid all liquors, live as simply as she can, and keep the bowels in such a state, that the stools may not be hard. If she be strong and plethoric we may bleed once; but it is a bad principle to bleed young people, as it lays the foundation for a larger quantity of blood being formed than ought to be. Between one period and another, the parts about the pelvis should occasionally be immersed in the tepid bath, and afterwards rubbed, and as soon as the pain comes on should be put in a warm bath: this may even be done the night before. The pulvis Doveri should also be given to assist perspiration, which is always an object in the present case. Pursuing this plan, the habit will be broken, and the patient may go for years without menstruating with pain; but when it returns, the same ground must be gone over again. It is often entirely relieved by marriage; so that it may sometimes be useful to recommend this change of state to the consideration of the parents.

Fluor Albus.—Whites. This is another and very common complaint Most women conclude it leads to disease, and some are much alarmed at its appearance. In procidentia uteri, it arises mechanically; for its cure, which is sometimes very tedious, the cold water bath is the best remedy of any that we know of: cold water may be injected into the vagina, and if this be not sufficient, an astringent may be added. The case is most unmanageable, when arising at the cessation of the menses: here it often precedes disease of the uterus, and should be treated as if we were in expectation of schirrus; recommending a careful abstinence from wine and spirits; animal food to be quite cut off, if the constitution will bear it; together with which, no exercise of any consequence should be allowed. An occasional purge should also be given; the injection and bath being used regularly.

Procidentia uteri, or the falling down of the uterus. The uterus is connected laterally to the pelvis, by the broad ligaments; and anteriorly by the round ligaments. When these parts have lost their tone, they allow the uterus to fall through the vagina, so that the menstrual discharge has been frequently seen coming from the lowest part of the tumour, the os uteri. The most frequent causes are, rising too soon after delivery or after abortion. Next to fluor albus, it is the most common female complaint that is met with. There is a dragging feel in the back, and uneasiness about the hips, arising from the dragging at the broad ligaments: there is also a pain in the groin, and the tedium these sensations produce are exceedingly uncomfortable though not amounting to pain. The procident uterus will at last interfere with the stools and urine, and be pushed down at those times, when the woman tells us she feels something like an egg; this gradually increases, till at last it falls altogether out of the body, producing pain, and perhaps ulceration of the os uteri, from the contact of the clothes; and the bladder, from its connection with the uterus, being dragged down, makes an angle with itself, which stops the passage through the urethra. Now while there are these powers acting in bringing it down, there are no muscles to bring it back; and where gravitation leaves it, there disease finds it. The only sure relief for procidentia uteri is from the use of pessaries; the best are of an oval form, flatted on both sides: the outer edge may be left broad and rounded off, as it is in close contact with the soft parts round it; but towards the hole in the middle it may be made thinner, and this will diminish the bulk and weight: these are to be kept of different sizes. The best are of wood; the cork pessaries cannot be kept clean. They were formerly made round; but this is more inconvenient, and obstructs the passage of the urine and fœces; they also used to be made with very large holes, this was dangerous; the os uteri has become strangulated by getting into it; when this has happened, a pair of pliars may be so introduced, as to break down the ring, so as to enable us to get it out. In introducing this instrument, it is anointed as we please, and so passed edgewise; it is to be laid across the pelvis in such a manner as that the largest diameter is from one ischium to that on the opposite side. This disease is curable in early life by a horizontal posture and the use of astringent solutions.

Dropsy of the Ovarium is by no means an uncommon disease. Its first symptom is a sense of pressure on the bladder or rectum; it may further affect the nerves and absorbents, producing dependent symptoms. But it is so long before it produces any real illness, that the water has sometimes been drawn off for some months before any other complaints have been felt. From one tumour, forty-nine pints have been drawn off; and in a few days afterwards, from another tumour in the same patient, nine pints more. There is a case mentioned by Bonetus, where 112 pints were drawn off. The fluid in these cases is not serous, but gelatinous and glary; and there has been fat and hair found in these tumours, and even teeth; this will happen where there has been no impregnation. It is a disease which may be borne a long time: in one patient, who had it from the year 1770 till 1798, it was tapped as often as eighty-four times. In the Memoirs of the Royal Academy, a woman is mentioned, who had it from the age of thirty to that of eighty. It always begins on one side, and gradually spreads over the other. As to treatment, none in the way of medicine has been known to have the

least effect upon it. Tapping will not always be quite successful; therefore, the patient should be warned of the probability of there being more cysts than one.

Another complaint to which females are subject has been called dropsy of the uterus; but for many reasons, no such disease can exist, and the expression therefore is incorrect. The cases mentioned of this disease have most probably been hydatids in the uterus. It is however a slight complaint which cures itself. Dr. Clarke mentions a case, where a lady with a tumour of this kind went into a pastry-cook's shop, and sat down in the parlour; the wet, which she felt, increased, till the whole shop was deluged, and very unpleasant conjectures were the consequence. In another case, where the lady was riding in a coach, which driving over the bad pavement, the weak membrane gave way, and the whole fluid escaped. Instead of a single hydatid, there may be some thousands hanging in clusters of all sizes. There will be no symptoms but increase of size with occasional discharges of water; and, when the uterus does contract, nothing will come away but the water and hydatids.

There are several other diseases which appertain to these organs, but which belong rather to the department of surgery than of the obstetric branch, and to that department we shall transfer them. These are enlarged nymphæ, imperforate hymen, diseased labiæ, polypus tumours, schirrous and cancerous uterus.

Final Cessation of the Menses.—This is a work of time; a work which proceeds slowly, for nature never acts abruptly: the discharge is first broken after having continued from 15 to 50 years of age. It is necessary indeed that it should be stopped gradually, to prevent the constitution from being destroyed; and it happens that the body is frequently broken by this event; in fact it is one of the most dangerous periods of a woman's life. It not uncommonly happens that the menses at this time become profuse, producing dropsy, and the woman is carried off in this manner. Another evil is, that at this period all glandular complaints which may have lain dormant for many years, now come forward. A little lump in the breast which has hardly been felt for years, will now be converted into a formidable cancer, which will destroy if not removed. Not unfrequently a tumour which has long lain harmlessly on the os uteri will now begin to give pain, enlarge, and be troublesome. The utmost care is necessary in regard to simplicity of diet, and regularity of exercise and rest: and the state of the bowels should be carefully watched. At this period, also, there is a disposition to a general enlargement of several of the sexual organs, which often induce a woman to suppose that instead of finally ceasing to menstruate, she has once more begun to conceive. The uterus appears to swell, the breasts to become full, and there is a sense of motion in the uterus as though a fœtus were in the act of struggling. This affection, for want of a better name, is generally called Spurious Pregnancy. Perhaps we are not exactly acquainted with the cause; but we know what is of far more consequence: and that is that in point of fact there is no pregnancy whatever, and that the symptoms which thus mimic it subside in a few weeks when attacked by a course of gentle cathartics, and free exercise.

Conception.

It is usual in this part of a treatise on midwifery to examine the different theories which have been offered to the world, on the mysterious subject of conception. The general physiologist, however, has usually contended that such an enquiry is a branch of his department: and strictly speaking we believe the physiologist to be right. On this account we shall transfer the whole which is usually offered upon conception to the article Physiology: under which the reader will find an account of whatever is at present known upon this subject.

We have also given a distinct section under the article Fœtus: to which therefore we refer for a minute account of the fœtus itself, and the contents of the gravid uterus in general, in regard to their structure and anatomy.

Pregnancy.

Pregnancy produces a great number of changes in the constitution, dependent upon the change which takes place in the uterus, the great centre of sympathy in the female frame. It also produces a variety of complaints which are rather troublesome than severe, and many of which must rather be palliated, than can hope to be cured till the abdomen is relieved of its weight. These are sickness, vomiting, heartburn, costiveness or diarrhœa, suppression of urine, and its consequences, and especially retroverted uterus, from a full bladder pressing upon it before it is much enlarged, varicose veins. Pregnancy is also not unfrequently succeeded by abortion or miscarriage. As we proceed we shall have occasion to refer to a few of these; the rest must be relieved by palliatives and remedies employed as occasion may demand.

Among the first proofs of pregnancy, or of conception, as it is at first called, we may mention a disposition to hysteric fits, and especially in delicate habits a continual tendency to fever; the pulse increased; the palms flushed, and even sometimes a small degree of emaciation: an alteration in the constituent principles of the blood also generally arises, giving the buffy appearance to the blood; and if from any complaint fever ensue, this buff will be greater in quantity than at any other time it would have been; the face will grow thinner, the fat being gradually absorbed. There are also other symptoms of hectic; but the changes in the countenance are most observable. The little fever sometimes occasions a great churlishness of temper; a woman in such circumstances can hardly bear speaking to, and it frequently creates a degree of fretfulness unknown before.

Another sign of pregnancy is, pain and tumefaction in the breast, which is only a part of the uterine system, and is affected from the same cause with the uterus. The aerola becomes darker and broader than before; the rete mucosum is sometimes so altered, that it is as dark as that of a mulatto, while the skin generally is as fair as alabaster. The breasts enlarge, and will not bear the pressure of clothes so well as before; the woman will not be able to lie on one side so well as before: this proceeds from the skin not increasing in proportion to the secretion of the glands.

The next part that sympathizes with the uterus is the stomach: this is generally perceived in the morning; for though occasionally it is affected the whole day, it is generally felt on the first being erect in the morning. The morning sickness in the progress of pregnancy is closely connected with the growth of the child; so much so, that it has sometimes been a rule to judge that where this ceases the child is dead. Pregnant women have antipathies and longings: and this desire is in some for

the most strange things, as is well known to almost every medical practitioner. No woman can be with child if she menstruate; this is the *sine qua non* of pregnancy; for though there may be sometimes an appearance of blood, there is not that regular appearance of uncoagulating fluid which constitutes the menses; even in Hippocrates we may see this. If in a young woman, between the age of fifteen and thirty-two, the breasts shoot and are very painful, and she is not regular; if the areolæ are enlarged and dark, and she has morning sickness; there is little doubt but that she is with child. It is not likely that all these things should by any accidental cause, be present at the same time, though any of them may arise. There are also peculiar symptoms attending the pregnancy of particular women, as a cough, toothach, headach. Dr. Clarke relates an instance of a person being as completely salivated during a certain period of her pregnancy as ever was a patient in the Lock Hospital. When these symptoms occur, they mark a peculiar idiosyncracy in the constitution, and are the surest possible indications.

The uterus being the great centre of sympathy, the diseases of pregnancy are so many sympathies; and, considered as such, there are no parts which may not become affected by its influence. Not uncommonly there is a continual state of low fever; and yet pregnancy prevents the coming on of many diseases; but though it prevents many, it produces some which are serious.

The most troublesome complaint to which a pregnant woman can be subject is a retroverted uterus. When this disease was first known it was supposed to arise from fright or some other surprise: but this is not true There are no muscles attached to the uterus, nor is it capable of being influenced by muscular action. The only true cause for this change of position in it is quite mechanical. There is frequently great fulness of the bladder, and if it be very much distended, the retroversion will happen in consequence The only period in which it can happen, however, lasts but for four weeks, between the end of the third month and the end of the fourth. For in the early months of pregnancy, the uterus, in length from the fundus to the cervix, is not so great as to fill the space between the sacrum and the neck of the bladder, and cannot for that reason produce suppression, which alone constitutes the disease. This applies to all situations of the uterus in unimpregnated women, and women who are with child till the close of the fourth month of pregnancy; after which, the uterus cannot be made to go down into the pelvis When the uterus has once fairly mounted into the abdomen it is impossible for it to pass down into the pelvis again.

The retroversio uteri occurs thus: the bladder becomes full, and rises into the cavity of the abdomen; the neck of the bladder in rising draws up the os uteri with it, which drawing up of the os uteri is assisted by the fundus of the bladder pressing down that of the uterus, and, in nineteen cases out of twenty, the bladder in this way becomes the occasional cause of complaint; and when the complaint is formed, the suppression of urine is the only material object to attend to. For the uterus being retroverted, the woman cannot make water; therefore, it must be drawn off by the catheter.

When the water has been once drawn off, it will be necessary to pass the catheter twice a day, till, by the enlarging of the uterus, it rights itself. As it increases in size it will gradually rise; but as it may not be convenient for a medical practitioner to call twice a day for some weeks, it is sometimes advisable to attempt the reducing of it; which is done by the patient placing herself on her hands and knees, and the two fingers of one hand should be passed into the vagina, and a finger of the other into the rectum, by which means it is sometimes possible to succeed. Where the event is left to time, the uterus is sure to recover its proper situation; for which reason it is preferable to leave it.

In attempting to reduce a retroversio uteri, we must recollect always to empty the bladder, and never use force.

Abortion.—Miscarriage. At any time after impregnation abortion may take place: it is one of the most common complaints of pregnancy; whence it is matter of no small consequence that ever practitioner should well understand it.

Abortion is not peculiar to the human species, but they are more subject to it than other animals, because they lead more unnatural lives. We see, agreeably to this rule, that the domestic animals more frequently abort than those that are wild. In the human species the greatest number of miscarriages are between the eighth and twelfth week; perhaps there are most at the tenth week than at any other time of pregnancy; but why this should happen at that time more frequently than at any other we are ignorant.

There are two kinds of constitutions very liable to miscarriage; the most strong, and the most weak. The most strong, because there are some causes which act upon the vascular system: the most weak, because many causes act through an irritability of the nervous system. There are also various occasional causes of abortion; and among these we may mention sympathy. This has such an effect with other animals, that there is not a shepherd but knows that if one sheep abort, others will almost always abort too. If a sheep lamb, the shepherd always separates that animal from the flock to prevent the other ewes lambing before their time. One animal is thrown into action, because the other animal is acting. Consents, also, are common in animals as well as sympathies. Certain parts of the body are connected in disease; the nose with the rectum in ascarides, and the shoulder with the liver; crying is known to produce tears in many beholders. These are so many instances of a fact, which proves the impropriety of a pregnant woman being ever in the room with one who has been lately miscarrying. Yet perhaps the true cause of abortion is an indisposition in the uterus to grow after it has reached a certain size; when arrived at that size contractions begin, labour pains succeed, and this, being accompanied with the expulsion of the ovum, constitutes miscarriage; whether this happen at the second, third, fourth, or fifth month, it is still abortion.

The uterus is in some degree of the same nature with the bladder. In different people we know the bladder, without inconvenience, contains a different quantity of urine; in one person it will not, without his feeling uncomfortable, contain more than six ounces; but that is not as much as it can hold, because it will, if necessity urges, contain four times that quantity. In proof that it can dilate, every person may have observed that at one time the quantity which he retains with convenience will vary from that which he retains at another time. It is the same with the uterus, which may be disposed to hold a certain quantity of contents only, by which the ovum attains not more than

a certain size before it excites the involuntary action of the uterus by which the whole is expelled. That the disposition exists, and that this often produces miscarriage appears hence, that many women go to the usual time of miscarriage and feel all the signs of disposition to abort, and yet, if they keep quiet for a sufficient length of time, they will recover, and go the full time of pregnancy. This is accounted for by the disposition in the uterus to contract at a certain period of gestation. Tumours also may cause a disposition to miscarriage; constipation acts in the same way, for, while it lasts, it produces exactly the same effect that other tumours would. All circumstances which, by increasing the circulation, keep up too great a velocity in the motion of the blood. Thus, violent exercise will produce miscarriage; it will, by the increased motions of the blood, separate a portion of the placenta from the uterus, which is very easy to conceive; for a certain force, being applied to the cells of the maternal part of the placenta, will be sufficient to rupture them; and the cells giving way, the blood will make its escape between the surface of the placenta and membranes, so as to form hemorrhage. Where the flow of blood from the ruptured part is considerable, and it finds a different course between the membranes leading to the os uteri, it will produce then a considerable degree of hemorrhage. Violent hemorrhage will also sometimes arise from the use of spirits in too large proportion. Now and then accidental injuries done to other parts of the body will cause a partial separation of the placenta from the uterus. Acute diseases of the mother; pleurisy, acute rheumatism, continued fever, small-pox, scarlatina, may either of them produce miscarriage; there is no disease in which abortion is so dangerous as in the small-pox. Passions of the mind will frequently cause it; and none so surely as those which increase the action of the heart and arteries. Rage may separate the placenta from the uterus very soon. It is not essentially necessary that the force of action of the heart and arteries in general should be increased, because increased local action of the part is quite sufficient; whence, the union of the sexes often causes women to abort; and to make sure of breaking the habit, the best way is, to separate the wife from her husband for a time. Violent exercise of almost any of the passions may produce the same effect.

With regard to the signs of approaching abortion, the first and most obvious change is the absence of the morning sickness, which sickness is always a sign of health in the fetus, and goes away when the fetus dies. Another symptom preceding a miscarriage is, a subsidence of the swelling of the breasts, from being hard they become flaccid; by these signs will any woman, but particularly if she have miscarried before, know the approach of this state. There are also pains about the abdomen and back, which are so many evidences that the uterus has taken on this action. Hemorrhage, in general, also, attends these symptoms, though sometimes a miscarriage may happen with very little loss of blood. Women miscarry in various ways, with regard to the progress of the abortion. In some, the ovum is expelled, and in others it will come away in pieces. The ovum and its membranes may be thrown off first, while the decidua does not appear till afterwards; sometimes the ovum will come away in a clot of blood, and it would not be known as an ovum, if the clot were not broken down and examined: at times the membranes will break very early, and the fetus will come first. In some abortions there is great pain; the grinding pains will sometimes equal those of labour; while in others there is very little, the ovum appearing to drop off from its connexion with the uterus, upon the os uteri being relaxed, just as premature fruit drops from a tree; sometimes the loss of blood is great, at others little.

As to the prognosis in miscarriage, it will be influenced by the state of the constitution: if it depend upon the contraction of the uterus alone, the pains will go on as in labour, till the whole ovum is expelled. But where the miscarriage depends on some cause acting on the circulation the woman will lose often a large quantity of blood, become cold, faints, and the blood will stop. If during her fainting she be revived by wine and warmth, the hemorrhage will return, and the abortion perhaps be confirmed; but if these stimuli be avoided the blood will often coagulate, close the breach of continuity in the placenta, and the woman will go her full time of pregnancy.

There is very little danger in abortion, generally speaking, when happening in the five first months. We may say, that, provided the constitution be good, there is no danger before the fourth month. The vessels at this time are small, and the hemorrhage is seldom rapid: and the safety or danger of the patient will depend upon the proportional size of the vessels from which the blood issues, together with the time in which it is lost. But if it be continual, though not from large vessels, it may at length kill either immediately, or by overpowering the constitution. A child may be bled to death by leeches, and an infant has been known to die under the operation of a single leech; a woman who does not die while the blood is flowing, may die in consequence of dropsy caused by the loss of blood. Abortion never ends at once in death, but it produces weakness and dropsy. All miscarriages are more dangerous while the woman has an acute disease, and most so with the small-pox; the most dangerous days being from the eleventh to the thirteenth day of the eruption. When hemorrhage happens before abortion, it does not follow that the ovum must be destroyed; enough of the placenta may still remain attached to the uterus to carry on all the purposes of life, and the pregnancy will go on. The constitution, if good, will generally bear the loss of a little blood; as much should be taken as the patient can bear, for twelve ounces at once will be more effectual than sixteen ounces at twice in restoring the balance in the system. After which a saline draught may be given every six hours, with about six drops of laudanum in each; it is rarely useful or necessary to press the opiates beyond that quantity; a large dose of opium will frequently increase the force of action in the heart and arteries, while a small one will keep it in the state desired. The bowels must be kept lax with small doses of the purgative neutral salts; the patient must at the same time be kept quiet, with little or no animal food; farinaceous decoctions with vegetable nutriment is all that should be taken while this state remains, as these do not add to the force of the circulation.

If the abortion, instead of arising from these causes, and being attended with these symptoms, proceed from passions of the mind, or a relaxed state of the os uteri, the plan to be adopted is the use of opium, and the quantity must be considerable: if it is small, it will do nothing; but if large, the pains in the back and uterus will be relieved, and the abortion quite put by. When a habit of miscarrying is acquired, the woman will

know the period at which it is likely to occur; and, before that time comes on, laudanum should be had recourse to, from ten to fifteen drops, increasing it gradually till the time of danger is passed over.

The next occurrence demanding attention is the hemorrhage: we see clearly that fainting is nature's method of restraining a flow of blood. In faintness we know the small vessels are constricted by the whiteness of the skin; we also know that cold is remarkably effectual in stopping a flow of blood from any part, but especially the uterus: not only cold air, but cold water, and even ice, to the back, belly, and parts themselves; every thing should be taken cold, and concealed if possible; ice creams, juices of fruit, seeds, &c.: all the body should be cold both externally and internally. Considerable benefit is derived from ice being introduced into the vagina, and replaced every two or three hours; this will restrain uterine hemorrhage more frequently than any thing else; and if it do not stop it, the constitution will still be secured from the effects which a more profuse hemorrhage would have incurred, and the patient be preserved from the excessive weakness which would have been the consequence of it. Where there is pain without hemorrhage, there is no necessity for being very anxious; for in that sort of abortion the pains will gradually increase as in labour, and the ovum will be thrown off; after which the pains will gradually go off again, and abortion must take place here before the pains can subside. But it sometimes happens that there is great pain with the loss of blood; and though it may be that nothing good can be done to restrain the hemorrhage directly, yet assistance may be given in emptying the uterus; for after the ovum has separated, sometimes it will not come away: in this case the finger of either hand may be introduced, and some part got away; and if it should not be practicable in that way, it is sometimes possible to get in two fingers, and by this contrivance pass them through the os uteri, and restrain the hemorrhage by compression. Should the ovum not be capable of being brought away whole the membranes should never be broken, unless when, after the fifth month, the child can be felt through them before tearing them, in which case it will be possible to get hold of a part of the fetus, and so get it through and relieve the woman from danger; for though in the early months abortion is not dangerous, the danger increases every day; and when it admits of being treated like premature labour, it always should be, as that treatment ensures absolute safety to the woman; but if the membranes be ruptured in any early abortion, or before twelve weeks, the odds are, that there will be no more pains, for the waters having escaped which formed the bulk of the ovum, nothing but the thin skins remain behind, and these are so small, that they will not stimulate the uterus to act, and yet the vessels will continue to bleed.

Abortion is prevented, in the first place, if by observation and knowledge of the patient's life and knowing her to have been subject to miscarriages we induce her to avoid the same cause which has before produced it. It will next be necessary to take care that this does not occur, even if the former cause is applied, by bleeding and opening the bowels where there is sudden occasion, otherwise by laxatives and occasional bleeding only. If, on the contrary, there is reason to believe that the woman miscarried from weakness, we may prevent a recurrence of it by strengthening her by good diet, and the use of bitters and tonics. There are women who appear to miscarry regularly from the state of the uterus being, as we have already observed, unfavourable to growth beyond a certain extent; in this state abortion is frequently prevented by immersion in the warm bath; it lessens the disposition of the uterus to contract. If there be any reason to suspect great weakness in the uterus and uterine vessels, the application of cold will be of great advantage in giving the proper tone to the vessels. Many women miscarry in consequence of the connexion between the sexes: when this cause exists, the parties should be separated till the period is gone by; for after quickening there is infinitely less risk of its occurrence.

Labour.

The gestation being completed, labour, or the pain so denominated, is the natural process by which the child is forced into the world.

There is some little variance in the term of gestation of different women; at least the regularity in the human species does not equal that which we behold in other animals. The usual term is forty weeks or nine calendar months; and the period from which the time ought to be dated is a middle point between the antecedent and succeeding times of menstruation. The Roman law allows ten months to legitimate parturition, or, in other words, ten months after the death of the husband: Hippocrates, upon whose opinion this law was probably founded, allowed this term, in like manner, as its utmost stretch. and would not extend it a moment beyond. The old French law (for the present may perhaps vary) was coextensive. Yet Haller gives instances which it is difficult not to credit of eleven, twelve, and even more than twelve months: whence the law of England is wisely silent upon the subject, and chuses rather to trust to the fair professional opinion and observation of the day, in connexion with collateral circumstances, than rashly and abruptly to ruin a female reputation upon a moot and controverted point.

It is a law of nature, that about this period of time the fetus should be expelled from the womb: and hence, whether living or dead, whether light or bulky, whether the uterus be strong or feeble, the fetus is expelled. A thousand causes have been assigned for expulsion at this rather than at any other period, but not one of them appears to hold. It is a law of nature, and we know nothing beyond.

Labour then is intended to expel the child and its membranes from the uterus; and from the variety of phænomena it presents, it has usually and may conveniently be divided into three classes; natural, difficult, and preternatural. In the first kind the head presents, and the pains progressively increase, and in consequence of such increase, by pressing the head against the orifice of the uterus, gradually enlarge it, by which it becomes protruded into the vagina: the same coercive power being exercised over which the head of the child is shortly afterwards protruded into the world. The whole process is completed within twenty-four hours at the utmost, and is unaccompanied with difficulty or danger.

In the class of difficult labours, the head indeed still presents; but the term is protracted beyond this period from accidental circumstances that render it doubtful whether the life of both the

mother and child can be preserved; or are else accompanied with other accidents, as twin cases, floodings, convulsions, rupture of the uterus.

The class of preternatural labours includes every presentation besides that of the head, or that of the head itself, in conjunction with an upper or lower extremity.

Natural Labour.—In this division of labour there are four stages, according to the mode in which its progress is usually contemplated. The first stage is that in which the head of the child enters the pelvis, passing down as far as it can move without changing its position. The second includes the period of the child's head passing through the cavity of the vagina and os externum. The third, the change taken place in the vagina and os externum. The fourth, the delivery of the body of the child, and the expulsion of the placenta. In one of the two first stages the os uteri dilates, and in one of the three first the membranes are ruptured.

In the regular process of natural labour, the head, by the contractions of the uterus, is forced down and passed through the os externum. The uterus, after an interval of rest, again contracts, by which effort the shoulders are expelled. The breech and lower extremities presently follow. During the progress of expulsion the uterus contracts around the remaining parts of the child, and at the time the placenta only remains, the uterus is only sufficiently large to contain it. The next effort of the uterus, heretofore, by contracting its internal surface, not only assists in pressing out the placenta, but becomes the cause of the separation: while the same power, which separates the placenta and throws it off, prevents the occurrence of any serious hemorrhage. This is a most beautiful illustration of the mercy and power, as well as wisdom, of the Almighty.

At the commencement of this process there is almost always a discharge of mucus tinged with blood from the vagina, and the blood is sometimes intermixed in considerable quantity; a fact, however, which is of no consequence. There is at this time also very generally an uneasy oppression about the præcordia; and as the pains increase in violence, vomiting will often arise from the extreme distension of the os uteri, and the pulse generally augment in strength and frequency. At the same time the progressive pressure of the child's head expels almost involuntarily both the urine and fæces: while from the vicinity of the sciatic nerve cramp and paralysis occasionally take place from the same cause.

In labours of every kind there are many little things to be attended to, which, though seemingly frivolous, are yet of great importance, and, in general, are only acquired by practice: first, then, the bed should be so made, that the woman may lie comfortably both in labour and after labour, and that she may lie in the best way with regard to our convenience. If she is used to a mattress she may lie on one, it being the best sort of bed; but if she is afraid of a mattress, she may be allowed to lie on a feather bed, first making it as nearly as possible a mattress by beating the feathers all away to the other side of the bed. Upon the feather bed a blanket should be laid and a sheet, and upon these a common red sheep skin, or instead of it a piece of oil skin or oil cloth; over this a blanket doubled to four thicknesses; and lastly, a sheet upon this four times doubled, only lengthwise; this last sheet is to be laid across, and secured to the bedstead by tapes. When the os uteri is so far dilated, that in the event of the membranes breaking it would receive the apex of the head, the patient should be put to bed, but not before: for, with some women who have had children, it is astonishing how fast the os uteri will dilate itself; it sometimes takes place with such prodigious rapidity, that there is only time to get the woman on the bed before the child is born.

The woman should be undressed before getting into bed: her shift had better be tucked up around her; and, instead of a shift below, a petticoat will do much better, as it saves the linen. When placed on the bed she must lie as near as possible to the edge, and in the posture before described; this is equally proper in the easiest and most difficult labours. The lying-in room should be as airy as possible; and upon this principle it is that the poor people in the country get about sooner after lying-in than the same class of inhabitants of the metropolis: in the generality of cottages it is not necessary to be very anxious about this, there are few of them so air tight but that they will do without a ventilator. If food is proposed during labour, we should generally speak rather against than in favour of it; for if food be taken, it must be either digested or undigested; in either case it is productive of mischief: if digested, it becomes the fuel of fever; if it remain undigested, the stomach and bowels are all the worse for it: the proper refreshment is tea with dry toast, as this will do no harm. The urine should frequently be evacuated, and the perineum be supported with the practitioner's left hand as soon as the child's head rests upon it.

The reason why the perineum needs this support is simply this; a woman bears down with a force equal to three, one of which is voluntary; the natural structure of the perineum has enabled it to support, without danger, the contraction of the uterus; it has therefore, of itself, a power superior to two, which is the force of uterine contraction; but, in consequence of the patient's voluntary efforts being added to the involuntary efforts of the uterus, a force equal to three is acting against a power equal to only two. By pressing against this part, we do not say the head shall not come out; we only say it shall not come through a hole which is too small to receive it. In supporting the perineum, it may be done through the medium of a folded cloth, which is held in the hand upon the perineum, and keeps the hand clean from occasional discharges of meconium or fæces, waters, &c. and the perineum should not be left unsupported, till the shoulders are born; indeed laceration more frequently happens while the shoulders are passing than when the head is. The great art is, to give support close to the edge, against which the greatest force is acting, for the parts give way first at the edge. The perineum is to be supported from the time that it is stretched by the pressure of the head, and we must take care that we apply sufficient force to counteract the voluntary efforts of the patient.

As soon as the child is born, breathes, and cries, we should tie the navel string. To do this, about ten threads must be joined in the ligature; the first made about two inches from the body, and the second the same distance from that again, or towards the placenta. The division is made between the two ligatures, the second being only intended to prevent the blood escaping from the divided cord, and staining the bed. The next step to the separation of the child is the placing

dry clothes under the patient and to the perineum. Midwives apply them warm; this should only be done in winter, for warmth increases the discharge from the uterus. We should then lay the hand on the abdomen, to ascertain whether there is another child in the uterus; being satisfied of that, we are to proceed to the extraction of the placenta.

The uterus contracts after the birth of the child, so as to contain only this substance; and its contractions being continued, the surface naturally must first loosen and then separate itself from that of the placenta; and the same contraction which separates, expels it. It is generally necessary to pass the fingers up upon the cord which is held in the other hand, and if we be able to feel the root of the placenta, the separation is complete, and we have only to get it gently out from the os uteri. If the root of the placenta cannot be felt, it is dangerous to pull the cord with any degree of force; it is still attached to the uterus, and may produce inversion of the womb. When, by gently drawing the cord, we have got the placenta and membranes down to the os externum, we should have a bason ready to slip it under the bed-clothes; and in drawing the placenta out, the cleanest way to bring the membranes with it is to turn it round, by which means, after a few turns, we separate them neatly; after which it will be convenient not only to lay under the patient the end of the folded sheet which hung over the bed-side, but also to make some degree of pressure upon the abdomen by bandage, after which she may be entrusted to the care of the nurse.

Difficult Labour.—Of difficult labour there are three species. First, those labours which, though protracted, are ultimately accomplished by the powers of nature unassisted by art. Secondly, those which, although requiring the assistance of art, yet are compatible with the life both of the mother and the child. Thirdly, those which, besides being accomplished by artificial means, require that either the life of the child must give way to save the parent, or of the parent to preserve the child.

The first source of difficulty is weakness: we know that labour requires a certain quantity of force or power, therefore labour is more likely to be difficult in weak than in strong women: we have many proofs to the contrary; but generally speaking it is so.

Fatness is another predisposing cause of difficult labour: fatness offers resistance, and generally occurs in women of weak constitutions; so that here we have both resistance and want of power. All asthmatic and pulmonary complaints generally will cause difficult labour. We know that to assist the contractions of the uterus it is necessary to take and keep a full inspiration; and where the chest is not equal to the task imposed upon it, the labour will be more probably protracted.

Deformity of body, attended with constitutional weakness, will generally produce difficulty in labour; it is most likely that in these cases the pelvis is not formed as it should be, partaking of the state in which most of the other bones are. If a woman be too young, the pelvis will not be perfectly formed; and if too old, the parts will be rigid: the best time for a woman to commence child-bearing is between the age of eighteen and twenty-five. For though a woman may be in perfect health at thirty-six, yet we know that the parts were designed to be used at eighteen; and have been inactive for the rest of the time, and cannot then be so fit to act.

The next kind of difficulty in regard to labour is debility of the uterus, not disposing it to contract: this may happen in a woman otherwise strong, as a man may have a weak arm, while the rest of his body may be strong. Such a woman may have no character of weakness about her but this, so that we may not be able very readily to guess at the cause when it exists. It is not proper to give stimulants and opiates here to provoke contraction of the uterus; when stimuli are given, it is not recollected that they produce fever. Opiates are not quite so exceptionable; they save time to the practitioner, but in their effects we cannot govern them, else they occasionally save the woman's strength.

Another cause of difficult labour is the irregular contraction of the fibres of the uterus; where the longitudinal set and the circular set do not contract as they should do relatively to each other. This always arises from irritation of the os uteri, in needless examinations. The patient has strong labour pains without the delivery being forwarded. We may here recommend a dose of opium; after which it is probable that upon their action recommencing, it will be in the natural manner.

Passions of the mind are the next set of causes of difficult labour: the effect of them is to diminish the strength and frequency of the pains, till they at last subside altogether; and this will all occur in constitutions where the powers of action were originally very good. These things shew the necessity of keeping up the hopes of the patient to the pitch of security and confidence for from the moment that her confidence fails her, from that moment the pains are protracted, and that merely from the state of doubt and arising anxiety. This points out the necessity of never forming a prognosis of duration; we may form and declare our opinion as to the event, but never the length of time which the labour shall last; for if we were to speak the truth, our prognosis would be in general very unsatisfactory. If we only tell a patient it will be to-morrow before the child is born, it will depress her resolution, and damp her perseverance; the pains will diminish, and she will be all the worse for what has been said.

The os uteri may also become a cause of difficult labour by its being rigid. This state is natural to some women, and especially those who are somewhat advanced in life when they begin to bear; also with the first child the parts dilate more slowly than in subsequent labours. Rigidity may arise from repeated and useless examinations, and where the os uteri is rigid, it forms one of the most painful labours, accompanied with excruciating pains in the back. This state is attended with inclination to vomit and to sleep, both which things are in themselves useful; for sleep restores the strength of the body, while the vomiting strengthens the bearing down.

The os uteri when in this rigid state resembles inflammation in being tender to the touch; its hardness almost reminds us of a board, which is bored through the middle with an augur. This is one of two kinds of rigid os uteri; the other description of which gives a very different feel: it is more apt to give way under the finger, is of a pulpy substance, and in some measure resembles the intestine of an animal filled with water and drawn into a circle; and though this is not so rigid to the finger as the other, yet it is longer in giving way. This sort of swelling or thicken-

ing is sometimes occasioned by œdema, or ecchymosis, as it has been known to arise in a quarter of an hour; at the same time it lies between the os pubis and the child's head. It generally happens that from the pain there is a degree of fever present. But when once one part of the enlarged circle retires behind the head, the whole of it slips up, and the child is sometimes born in five minutes, if there is no resistance from the soft parts.

We must here be very cautious not to allow the woman to exhaust herself in fruitless efforts; for which reason we should explain to her that it will be of no avail that the mouth of the womb is not large enough to admit of the child's passing, and that it must be a work of time, and will be a work of time, notwithstanding all the endeavours she may make to shorten it. We should in the meanwhile fill up our time and keep up her attention by ordering an injection, or making some other preparation; and if the last be a six or eight ounce mixture, in case the os uteri is very irritable, and by frequent examination has been rendered more so by being deprived of its mucus, twenty drops of laudanum may be added to the mixture.

In difficult labours it will now and then happen that the vagina is very rigid, making considerable resistance; this very generally depends on irritation, by the interference of the midwife. The consequence is that inflammation of the periosteum and membranes covering the bones very often arises. In such cases patience and horizontal posture are both grand remedies; besides which, why not use fomentations, as in whitlow, or any other case, where relaxation is wanted.

The next cause that impedes labour, from resistance of the soft parts, is a full bladder and suppression of urine; this is not a formidable evil. In early examination we shall, instead of feeling the mouth of the uterus, come to the neck of the distended bladder; but in the progress of labour the child's head presses upon the neck of the bladder, which pressure causes the suppression. This will never happen if the bladder be frequently employed in the early part of labour, because the time between the head's being at the upper aperture of the pelvis and delivery is in general of a moderate duration, in which no serious accumulation can take place in the bladder, unless the labour is very long. When it is necessary to draw off the urine, the catheter will enter the meatus urinarius with greater ease if its curve be a little increased: with regard to a woman in this situation, we should never rest satisfied that her bladder is not dangerously full, because we see a little water which has passed without the instrument. We must never allow the woman's delicacy or dislike to prevent our examining: we must represent to her the importance of it; for if she die from a burst bladder, it will be a very deplorable circumstance, as it is so easily prevented.

Contraction of the vagina forms another impediment to labour. If this be the consequence of a cicatrix it will sometimes be proper to divide it by a knife, in order to allow the child's head to pass; though when we attempt to divide it high up, we are in a very delicate situation on account of the bladder and rectum; and if the head have passed so far forward as to come into view, it will be adviseable to leave it to nature. Excrescences arising from the os uteri or vagina may impede labour, though these causes in general only produce slight difficulty: the os uteri has been known to be in such a state from a tumour on its side, that only two thirds of the circle have dilated for the passage of the child's head. In most cases the tumour is pushed aside, so that it occupies a protected situation during labour, and the head passes very well.

An unfavourable state of the ovum may protract labour. It is stated that the navel-string may be tied round the neck of the child in its passage through, by which the effect of each pain is lost; being held on each side by the string, it is forced a little forward in each pain, retiring again as soon as the pain goes off. It does not appear likely however that this ever happens, because the effect attributed to the elasticity of the cord may be seen in every labour from the elasticity of the soft parts, and more particularly where the head is larger than the cavity of the pelvis. So that there is no reason to believe this to be a cause of difficult labour. Yet we may now speak of its treatment, when it does occur. The cord is frequently turned round the neck of the child when the circulation is not in the least interrupted; in this case we have only to turn it off the neck, and if the circulation be felt, leave it. Where the loop round the neck is tight so as to interrupt the pulse, we may loosen it by passing the finger between it and the skin of the neck, so as to feel the pulse again. It has been said to be sometimes so tight as not to admit of its being slackened at all; this is just possible, and the most improbable thing in the world. It is then to be divided between two ligatures.

Rigidity of the membranes has been stated to produce difficult labour. It has been observed labour was quicker when the membranes were ruptured early; but though the labour is slower, it is safer where the membranes are unruptured. Where the membranes are to be opened, there have been a great number of pretty-looking instruments invented for doing it. Long tubes, at the end of which blades or points were projected. But it requires more skill in telling where they should be let alone, than were they should be meddled with. With the first child they must never be broken; the inferior parts of the passage dilate but slowly, and require the assistance which the membranes are capable of giving. But in subsequent labours perhaps it may be admissible, where the pelvis and soft parts are known to be capacious and yielding. The time when they should be broken is when the head may be received into the os uteri upon their breaking. Never must they be broken before the os uteri is of the proper size; if they be we cause a continual drivelling of the waters, which in itself is productive of great delay. It will often protract the labour two days: it has been known to protract it three weeks.

A frequent cause of the rupture of the membranes is the using too violent exercise for the parts to bear. The riding in a coach over the rough stones will bring it on, as the weaker part will always give way first; another cause of the membranes giving way may be the death of the child, for dead members will give way when a living member will not give way.

The next cause of difficult labour is in the disproportionate size of the child's head, compared with the cavity of the pelvis. This is not mollities ossium; but a disease which, independent of that, is capable of producing considerable difficulty. The different size of the head will regu-

late the progress of the labour. The head may be so large as not to pass, and this increased size of head may be combined with a state of pelvis which in shape resembles a man's; which pelvis would not admit a head of an ordinary size. The head may also be accidentally larger than it should be, for two heads of the same absolute size shall in labour prove to be of different sizes: that is, the first shall give way and allow of compression by the soft parts; while the second, by being more perfectly ossified, will not allow the bones to slip one over the other, as in the first instance; for which reason one of these two heads will in effect be larger than the other: the volume of the head may be also increased by a descent of one or both the hands; or it may occupy undue space by a wrong position. In all these cases instead of trusting to time, or using instruments, we may generally afford relief by introducing the fingers and turning the head right. Independently of these difficulties there are others of a totally different class, and which produce difficulty chiefly by rendering a labour more complex. The first which we shall notice is the presentation of the umbilical funis.

We have already explained that the fœtal life is that of a fish; that it is furnished with an apparatus resembling gills; that the funis is analogous to the pulmonary artery and vein; and that the circulation through it, if stopped, produces death upon the same principle that suffocation does to an animal which breathes. Hence the importance of the funis presenting. Let what part will present, arms, legs, shoulders, or breech, it is of consequence from this circumstance chiefly. It is of no consequence in regard to the woman's safety, and all treatment is applicable merely upon the simple ground of preserving the child's life while labour goes forward. From whatever cause the funis has presented, the effect is the same, and the treatment must be directed by the circumstances of the case. Suppose the membranes lately broken, and the os uteri pretty fully dilated; the funis being down. The best practice here will be to turn the child, and bring down the feet; as this affords the best chance for saving the child's life: though where this happens with the first child, it is as well to let it remain, for the operation of turning will then of itself produce the death of the child. Suppose the head in the pelvis, and the navel-string pulsating in the vagina; the best way is to return it, and follow it up with a long strip of cloth, or handkerchief, artfully pushed up, so as effectually to prevent its coming down again. And as this is the only chance that we have of keeping it above the pelvis, this should never be left undone; and at last the head will get so far down, that it can be delivered by the forceps immediately. In all cases we should recollect that the woman's safety never must be hazarded by doing that which will only obtain a precarious chance for saving the life of the child.

Plurality of Children.—The disposition to multiply is general throughout the whole creation; even in vegetables it is not unusual to see two kernels in one nut; and the sheep, instead of having one lamb, will sometimes bring two. All uniparous animals may have two young ones, though in some species it is more frequent than in others; it is not so common for a mare to have two foals, as for the ewe to have two lambs. In the human subject twins occur once in about forty-eight labours: this calculation is taken from the lying-in hospitals of London, Edinburgh, and Dublin. There are sometimes more than two; as three, four, and five; but such instances are extremely rare. Dr. Osborn mentions a case where in an early miscarriage he saw six distinct ova, each complete; and there is a monument in Holland to a woman, who, the inscription declares, had 365 children. But it signifies not whether there is one or 365 in the uterus, for each has still its distinct bag of membranes, each its own placenta; though sometimes the placenta are joined so closely, that they would almost seem one cake.

There is no mark by which we can distinguish twins till after the birth of one child. It has been said that labour is then more slow than at other times; but this would imply that single labours were never slow, which happens to be very far from true. Another opinion is that the woman is bigger than in other labours, and this would seem to be very natural; but it certainly is not very true, but very much the contrary; and many practitioners have declared that they have never once been right in their opinion upon this subject. So that the difficulty of the labour at first will depend on itself, without any reference to the child. But after one child is born, we can easily lay our hand upon the abdomen, and determine the point; not forgetting that where there are more than one child, the placenta must never be brought down till the last child is delivered; for if we use any force so as to detach a part of the placenta from the uterus we produce a flooding. If the abdomen be examined before delivery, we shall feel the tumour reaching high up to the scrobiculus cordis; if after delivery, we shall perceive a rounded tumour lying on one side above the pelvis like a football. If we examine the abdomen in a twin case, after one child is delivered we shall not be able to say, from the diminished size of the tumour, that one child has come away.

When we have ascertained that a second child remains in the uterus, we should wait quietly, and without communicating the fact to the patient herself lest we alarm her, till by a recurrence of the pain, we find the part that presents; and if it be an arm or shoulder, we should tuck up the sleeve of our shirt, and pass up the hand greased into the uterus, without any preparation on the part of the woman; it is here better avoided, and the child may be turned at once. The one child has already passed, therefore the contractions of the uterus and vagina will be a smaller impediment here than in any other case. Before we thus act, however, it will be better to leave the patient to recruit herself awhile. If the practitioner be a young man, it is best to wait about four hours, before he does any thing towards the delivering the second child; an experienced person probably need not wait so long. If we wait four hours, no harm can happen from hastening the delivery; we have waited so long as to justify ourselves in the eyes of all the world.

A twin case is not quite so safe as a single birth; for the woman will sometimes die without our being able to give the least reason for it. As there have been some fatal instances, we should be upon our guard not to say there is no danger in such a case; we may say they are commonly not cases of danger, but should not, when asked, affirm that it is perfectly safe.

Convulsions.—Cases of puerperal convulsion bear a strong analogy to epileptic fits: so much so, that it is nearly impossible to distinguish them at first sight, excepting from the different degree of violence attending each: the fit of puerperal convulsions

being much more violent than any fit of epilepsy. The paroxysm is so violent indeed, that a woman, who, when in health, was by no means strong, has shaken the whole room with her exertions.

Puerperal convulsions may occasionally arise at any time between the sixth month and the completion of labour; they seldom or never happen before the sixth month. They may arise as the first symptom of labour, in the course of labour, or after the labour is in other respects finished. Puerperal convulsions have these characters belonging to them; they always occur in paroxysms, and those paroxysms occur periodically like labour pains; so that there is a considerable space, perhaps two hours, between the two first attacks: after this, they become more frequent. They not only occur with the labour pains, but in the intervals; and whether there have been labour pains or not, before they come on we shall always find the os uteri dilated, and it is sure to become dilated from the continuance of these convulsions; and at length, if the woman be not relieved and the convulsions continue without killing her, the child is actually expelled, without any labour pains at all. On opening such cases after death, where the convulsions have been violent, the child has been found partly expelled from the contraction of the uterus; which power is capable of expelling it even after death. In one case in which it happened, the whole child was expelled except the head.

It is a disease depending on the uterus, and brought on by the labour pains; or if arising before them, is of itself capable of expelling the child, if the woman survive long enough. It occurs in all presentations: sometimes with the first child, and sometimes with those born afterwards. It resembles hysteria, as well as epilepsy; but is more violent than either. No force can restrain a woman when in these convulsions, be the same woman naturally ever so weak. The distortion of the countenance again is beyond any thing that can be conceived; in regard to deformity, surpassing any thing the imagination of the most extravagant painter ever furnished: nothing bears any resemblance to the progress of this disease; the rapidity with which the eyes open and shut, the sudden twirlings of the mouth, are altogether frightful, dreadful, and inconceivable.

These convulsions are by no means external only; respiration is first affected with a hissing, and catching. The patient stretches herself out, and immediately the convulsion begins. The next symptom which arises comes on after the convulsive motions have continued in their utmost violence for a time; the woman foams at the mouth, and snores like an apoplectic patient, indicating great fulness about the brain. These symptoms are succeeded by a comatose sleep, out of which she awakes astonished, on being told what has happened, not in the least aware that she has been in a fit; and then she will fall into another fit, out of which she will again recover as before. It rarely happens that the understanding is taken away in this disease, until it has been repeated several times. In the fit the skin becomes dark and purple, proving that the circulation through the lungs is not free, which purple colour leaves the woman gradually after the fit is gone; and it is not only the external parts of the muscles of respiration that are affected here, but the uterus also. This is known by introducing the hand when the convulsions come on; the uterus will contract, but with a tremulous undetermined sort of force, perfectly different from what it does at any other time.

There are two cases of puerperal convulsions which are very distinct: one is a convulsion dependant on some organic affection of the brain; the other, on an irritable state of the nervous system. Where puerperal convulsion arises from the former, but more especially from fulness of vessels or extravasation, it is always preceded by some symptoms, which, if watched, will enable us to relieve, if the patient sends in time, which, however, is rarely done.

In a patient strongly disposed to this complaint, there will be a sense of great fulness in the region of the brain, which amounts even to pressure, giddiness in the latter periods of pregnancy, dizziness in the head, and a sensation of weight when the head stoops forward, which gives her the idea that she shall not be able to raise it again; imperfect vision; bodies dancing before the eyes, sometimes dark, at others luminous. This state of the eyes denotes fulness of the vessels of the head more surely than any other symptom, and if allowed to continue will lead to extravasation and puerperal convulsions. The disturbed vision is a very strong symptom, and must never be passed over. If attended to early, even though symptoms of the complaint are present, still it may, by timely assiduity on our part, be prevented from ending in premature labour. Here repeated bleedings and purgatives are all in all; the sole object being to take off stimuli. After bleeding, and before any aperient is given by the mouth, we should give a solution of soft soap in warm water as an injection; it is the quickest as well as the surest means; then a purgative mixture, with manna and Epsom salts. By these means, that is, by bleeding, purging, and the abstinence of all solid food and wine, no more blood is made, what the patient has is diminished, and she gets gradually better.

When convulsion arises from a general irritable state of nerves, it is difficult to distinguish the disease before it becomes established. It is most frequent in large towns, and in those women who lead the most indolent life; hence it is found in the first circles of fashion, in preference to the others; and there is one grand circumstance which has great influence in its production, that is, a woman's being with child when she should not. Being obliged to live in a state of seclusion from society for some months perhaps, she reflects and broods over every thing which relates to her situation, and which gives her pain: she recollects she is not to enjoy the society of the babe she has borne, but on the contrary will be obliged perhaps to part with it for ever: she is afraid of her situation being known, and that she shall be considered an outcast to society. In this way she will brood in solitude, till at last the mere irritation of labour may be sufficient to excite puerperal convulsions. The difference between this kind of puerperal convulsions and the other does not probably exist in any thing visible: it is not possible to tell the difference exactly; but just as it is coming on, the woman will complain suddenly of a violent pain in her head, or the stomach, which is expressed in the same way by all women; they all say they cannot survive the pain if it return. The mode of treatment will not essentially vary from that already mentioned. Our plan however should be less active, and opiates may be allowed to succeed it.

These observations relate to convulsions antecedently to labour. We now proceed to the same disease during labour.

It has sometimes happened, that a woman has died of the first convulsion; but it happens much

more frequently that a number come on in succession, arising either before or after delivery. The patient very rarely dies in the fit, though she die from the convulsion; she dies in the comatose state which succeeds to the fit; and if we be suddenly called to a patient in this state, where we are unable to learn the circumstances of the case, and we evidently see there is great fulness about the head, we should immediately open a vein, and draw blood largely, being regulated by the appearance of the body and what we are able to learn from those around. From twelve to twenty ounces may be the extent of the first bleeding; if the disease go on, and the os uteri do not admit of delivery from its not being in the least dilated, the convulsions not gone off, and the pulse in such a state as admits of it, we should bleed again, and again. Some practitioners have with the greatest advantage taken sixty ounces of blood in a day. A woman in this state will admit of divided bleedings very largely. This takes off the pressure from the brain, made by the blood while in its vessels; and also the chance of its being extravasated. This must be done immediately: then the head must be shaved, and a large blister applied over the whole cranium. The next means of relieving is getting the bowels into action as quickly as possible; first, by throwing up a soft soap solution in the form of injection, and then by giving a concentrated solution of some neutral salt with infusion of senna.

If it be a case of convulsions depending on irritation, we may certainly do something more by the use of opiates; and here we must be limited in the quantity of blood which may be taken away. The proportion must be small compared with that proper in plethora. Eight or ten ounces will be a full bleeding; and if it be necessary to take more, we may apply leeches to the temples, never neglecting the bowels, which must be kept very open. It has been directed that the patient be put into a warm bath; but experience contradicts its use; the fits have been found to be more violent in it, and the patient is liable to bruise herself in it, and be otherwise much injured.

It is an extremely dangerous disease: it is impossible for her brain to bear the violent pressure of her situation; opium, in cases of irritation, is proper, and should be given to the greatest possible extent. With this we may join the affusion of cold water. This, when resolved on, must not be done by sprinkling a little out of a bason upon the patient's face; but we must have both a full and an empty pail, the patient's head being brought over the side of the bed; and before the fit has come on, we may, as in other convulsions, detect its approach by attending to the intercostal muscles, the vibrations of which will warn us that no time is to be lost; when we should immediately discharge the whole over the head at once. Whenever this complaint occurs at or near the time of labour, it is uniformly right to deliver: to dilate the os uteri, and deliver immediately. We should deliver in all cases where it is practicable; for this is the only cure for puerperal convulsions.

If convulsions occur some days after labour, it should be treated as the same disease in other cases.

Rupture of the Uterus.—This was formerly considered as a very rare occurrence, though it probably happened oftener than practitioners were aware of. We have many descriptions of sudden deaths in labour, the symptoms of which exactly correspond with those known to attend ruptured uterus. It may be divided into two kinds, spontaneous and accidental: the first happening most commonly in the cervix uteri, and the last in any part of the uterus.

Spontaneous rupture occurs suddenly and unexpectedly, and always without any warning, and for this reason, that it depends on the irregular action of the muscular fibres; and all muscular contraction is immediate. It most commonly happens, that when the head of the child is in the cervix uteri, the lower segment of the uterus is received into the upper aperture of the pelvis, and the aperture of the pelvis without the uterus is opposite to the bones of the head within the uterus; the consequence is, that the uterus is pressed firmly between the two forces: from the pressure being applied in this situation, the longitudinal fibres can only contract from the pressed circle towards the fundus; and upon this principle it will not tear at the extremity, but will tear from the part so pressed upon; the rent once made, may run in any direction.

Accidental rupture occurs from the action of the uterus being violent while the hand of the practitioner is within, or the same thing may happen from pressure of the knee, or some other of the child, which last is frequently the cause.

The manner in which the uterus gives way in this instance, is exactly a fibre contracting over a pulley, which being a disadvantageous position, is liable to be ruptured if the contraction is strong. Certain symptoms take place which are evidences of its having happened; one is a sensation of a sudden and most excruciating pain, which always comes on at the moment of the rupture. A lady, when in labour, was attended by a most respectable practitioner, and a man in years; this case is an example of the manner in which it may come on. The labour went on perfectly well, and it being late at night, he proposed that the husband should go to bed, as his wife would be delivered in three or four hours more. The gentleman then sat down by the bedside of his patient, and in about three quarters of an hour she began to scream suddenly; he supposed the head was in the vagina, as the labour had gone on so well, when to his astonishment he found the head was not to be felt, it had entirely receded. She would get up, and he in vain prayed and begged her to lie still. This state of pain and restlessness was succeeded by faintness from two causes, hemorrhage, and pain. These are attended with another, which is the sudden loss of labour pains. There is a faint inclination in the uterus to keep them up, but they are sure to sink. The organ is destroyed, and its functions must necessarily be destroyed too. There is great restlessness, accompanied with a sense of pain, different from that lately felt: there will be faintness, but without loss of blood externally, for it generally passes into the abdomen; there will be vomiting of a tenacious chocolate coloured fluid; the head or other presenting part recedes usually, and the child can be no longer felt.

All these symptoms combined, become a proof of ruptured uterus; but any one of the symptoms may occur alone; the patient may be in violent pain without rupturing the uterus; she may faint, but it does not follow that her uterus is torn: there must be all these things in common; excruciating pain, a fainting, sickness, and vomiting of that singular kind, and the retiring of the presenting part; these in the aggregate will determine our opinion. If in a case of this kind we find the head has only entered the upper aperture of the pelvis, we cannot get the forceps applied: here it has been said we might turn and bring down the feet: but

this should never be attempted; it only occasions more mischief; the only chance is to open the head of the child. If, however, from the head being high up, and loose, we think that we can embrace it with the forceps, we may try, for we by this mean give another chance for the delivery of a living child, which is a great object at all times.

Suppose a case where the child has actually retired from the cavity of the uterus into the cavity of the abdomen, what is to be done? there have been different opinions; some say it is best to bring the child back, while others leave it to nature. It should always be returned and delivered by the feet. The chance is something in favour of the mother, whose case cannot be worse, and largely in favour of the child.

Uterine Hemorrhage.—Flooding cases belong naturally to this section, hemorrhage being one of the constant attendants on the last mentioned accident. We have already considered the history and management of trifling floodings occurring in the six first months of pregnancy, when speaking of the management of abortion: what we are now going to treat of, relates to the three last months: the commencement of labour; during the progress of labour; or after the delivery of the child, and before that of the placenta; and each of these divisions, as regards time, will run into the rest.

The proximate cause of puerperal floodings is in all cases the same thing, consisting of a partial separation of the surface of the placenta from that of the uterus. The difference existing in structure, between the human placenta and that of brutes, accounts for it happening less frequently in them than in us. In quadrupeds the fœtal part separates from the maternal portion, as was before explained; while in us the whole placenta comes away entire, leaving vessels with open mouths; so that when any portion of the placenta is separated by any mischance, a consequent hemorrhage attends, which is proportioned in violence and duration to the extent of the part so exposed. The vessels are largest towards the middle of the placenta; and some of them are very large indeed on the inner surface of the uterus.

The occasional causes of uterine hemorrhage may be any circumstance capable of separating a portion of the placenta from the inside of the uterus. These were enumerated when speaking of abortion: all acute diseases; passions of the mind, as rage, &c. strong liquors in large quantities; and besides these, if the placenta be attached close to or over the os uteri, it will be very likely to produce hemorrhage, either before or in labour. When it is attached on the cervix uteri, it must in the course of the labour be separated by the dilatation of the uterus at its neck; this is so plain, that it cannot require illustration. Such a situated placenta will almost ensure uterine hemorrhage in the last months of pregnancy, which may be more or less in quantity.

If it be very slight, the necessary means to restrain it need be nothing more than what is used in slight hemorrhage from any other part; but when violent, and the patient either gets one gush of blood, or it comes in quantity till she faints, and then it is restrained, and she gradually recovers; and then it recurs from her taking some stimulus into her system, either food, or drink; she has no sooner recovered a little strength, than another bleeding comes on, and she will faint and recover, and the flooding again recur, and so on; the faintness causing the restriction of the vessels; the retriction of the vessels allowing the circulation time to restore its own equilibrium: and when once that has arisen, the force of the circulating blood again overcomes the slight resistance formed by the contraction of the vessels and the formation of the coagulum.

When once a woman has had an uterine hemorrhage, from whatever it has proceeded, she is never safe; and must remain in jeopardy every hour, until she is delivered; for the slightest circumstance may reproduce it after it has once happened. The danger in this state is not from the quantity of blood lost, so much as the manner. A bleeding has come on at the third-month, which was exceedingly large in quantity, but in consequence of its not flowing very quick, the woman has survived. Miscarriages occur in which a large quantity of blood is frequently lost, without the woman dying; insomuch that where abortion takes place in the tenth week, she very rarely dies from loss of blood, though sometimes this is excessive. What then does this depend upon? the time in which it is lost, and the way in which it comes on; for although lost from the constitution, it is from small vessels. But when there is a sudden gush of blood from large vessels, the case is quite different. From experience we know that large vessels do not contract so soon as small ones; there is not time for faintness to intervene, and the patient consequently dies immediately.

One symptom of the greatest danger in a flooding case is a want of labour pains, when it occurs in labour; which is the reason that the midwife hardly ever sends for us till it is too late; she thinks nothing can be necessary to be done till the pains go on as they should do, while in fact their subsiding is one of the worst symptoms. It shows that the uterus has not energy enough left to expel the child; so that we always judge uterine hemorrhage to be worse when not attended with pain than when it is. Another bad symptom is, when the os uteri feels relaxed, and flabby like a piece of dead meat, with a hole through the middle of it. It resembles an inanimate opening; we may without resistance move its lips in any direction When the hemorrhage continues long, the face loses its colour, the mouth and lips become quite pale, and the little projection at the inner canthus of the eye is a very significant part with an attentive observer; it is not often attended to, but if it be sunk, it is a symptom of decided danger: these are followed by want of rest; the patient will be moving about in bed, and that notwithstanding all that we can say, if we even represent the risk of her producing her own death by it, still she will be throwing her arms in every direction, and rolling backwards and forwards in the bed. In this way then will she proceed, one fainting fit succeeding another, at last so rapidly, that it can scarcely be conceived until seen: fits of vomiting towards the end will occur, together with a sort of convulsive raising and lowering of the pomum adami, and life will at last leave her suddenly; perhaps after she has been speaking she will lay her head down and die.

The next danger is, that she may drain to death, by a slow progressive state of the complaint. To-day she shall lose a pint of blood, to-morrow half a pint, next day none, the day after that again a quart, and so on, till the powers of life are exhausted. Thus is she drained to death; for the stomach is not capable of supplying nourishment quick enough to counteract so rapid a consumption.

There are still other dangers arising from uterine

hemorrhage, the consequence of which we have great reason to fear. Suppose a woman in labour loses two quarts of blood by the vessels of the uterus, that woman will, about the fourth day, have a perfect fever in all its characters, somewhat resembling the milk fever, the pulse 120, the countenance flushed, the skin hot and parched, though we should naturally enough expect that instead of producing fever, the loss of two quarts of blood might more readily be expected to take fever off where it existed before. Supposing even that the patient gets quite clear from any return of the hemorrhage, the fear that remains is, whether she have not already too much for the constitution to repair; and we must again wait in expectation of the fever: if that do not come on, so much the better, that is another danger got over. But she may die at the end of twelve months, and that from the effects of a single attack of this complaint. This will in most instances happen in women who are of a flabby loose texture, and have a heavy fat body. Hydrothorax, or ascites, will in these persons supervene at a great distance of time, entirely from the debilitating effects the loss of so large a quantity of blood has induced,

With regard to the powers by which hemorrhage is naturally restrained in different parts of the body, we may say that they are two in number; one of which is the contraction of the blood vessels themselves, the other is the coagulation of the blood in the mouths of the vessels which are ruptured. With regard to the contraction of blood vessels, it is well known that an hemorrhage is frequently stopped by that power alone. If we prick our finger, or shave a bit off, it would bleed everlastingly, were it not for the contraction of the divided branches which stops it, and that so effectually, that if from time to time we even wipe away the blood with a sponge to prevent any assistance which might arise from the formation of coagulum, yet the bleeding will stop. But as the vessels contract gradually and slowly, the blood which forms on the surface being exposed to the air coagulates, and becomes the second cause of the blood ceasing to flow from the divided vessels. So that hemorrhage, considered in general, may be said to be restrained partly by the contraction of vessels, and partly by the coagulation of blood in the vessels. The natural powers by which hemorrhage is usually restrained are the coagulation of the blood as it flows, and the contraction of the vessels. To these a third power is added in the uterus: it is the contraction of the organ itself, and it is not only one of the three, but the most important, as being the most effectual power of them all, in stopping the hemorrhages which flow from the internal surface of the uterus. It should appear also from the experiments of Hewson, that the coagulation of the blood is more rapid in animals when dying, than at any other period; hence he argues that coagulation is always in proportion to necessity.

With regard to *treatment* we may observe that in slight cases, where the quantity of blood lost is very trifling, it will not be necessary to notice the existing state of pregnancy, but to make use of the common remedies for the checking of slight hemorrhage from any internal part. But if there be increased action of the heart and arteries, and we know the constitution will bear it, we may take away ten ounces of blood, and suppress the animal food; moderating the sanguiferous action, so that there shall be no risk of displacing the newly formed coagulum, in its recent state, a tender jelly. If these things are attended to, the blood will perfectly cork up the bleeding orifices of the ruptured vessels. We should at the same time empty the bowels, prohibit all stimulating aliment, and advise a horizontal position. All this however refers to slight cases and an early period; if after this period, or during labour, we must seldom be beguiled from more active measures. The only solid security is a delivery of the child, for which in all cases of profuse or continued hemorrhage we should immediately prepare; and in the process to be pursued we are of course to turn the child.

Wherever in doing this the os uteri very easily gives way, it is the very essence of danger, proving the want of contraction in the uterus. In the present instance, however, we do not want to empty the uterus so much as we wish for its contraction; for if we get away its contents at a time when it cannot or will not contract, we do no good. If the placenta seal up the os uteri, we must go directly through: we may easily indeed screw our hand through it, for it is a loose pulpy mass easily torn. We should not wait long, nor be afraid, and if the labour be recent, we may turn the head and bring down the feet; if the head be low enough to apply the forceps, we may deliver in this manner. The whole of this practice lies in a very small compass; in determining to deliver early, and in determining that our patient shall not die: and it is founded on the principle that hemorrhage from the uterus cannot be restrained by the two powers which are sufficient for stopping a flow of blood in most other parts of the body; by the contraction of the vessels, and the coagulation of the blood in them: and that nature has here appointed a third power, by the presence of which, the human uterus differs from that of all other animals. It is right, however, after turning and bringing down the feet, to allow the child to remain undelivered for a short time, attending to the least pain that may be felt, and gently assisting in the forwarding the expulsion; and when the child is born, to wait the action of the uterus again for the expulsion of the placenta; for we must still recollect the grand object is the contraction of the uterus, without which its being emptied would produce very little good; it will then happen, that the same contraction which expels the placenta will diminish the area of the vessels, and the danger from flooding ceases. But if this contraction do not take place soon, and the hemorrhage continue for some minutes after the extraction of the child, we must consider whether the strength will not be lost, and the safety of our patient endangered: if so, the placenta without delay must be separated by introducing our hand.

Immoderate Discharge of the Lochia.—The next view of uterine hemorrhage is that where it does not stop on the extraction of the placenta. Such cases as these are very rare; there may be a sudden gush of blood, and often is, following the placenta; the reason of which is that the uterus, at the time it expels the placenta, forces down every particle of blood with it; and in this way a pound or a pound and a half may escape, but that need not be regarded in the least; it does not affect the constitution, because it was not evacuated immediately from vessels; it was lying in the uterus. So when we amputate a limb, there is no loss of blood to the constitution, because the whole of the blood which is taken away is necessary to the limb; and no longer necessary than while the limb was to be supplied. But supposing that from the vessels not being properly secured in the operation, there is a bleeding afterwards from the stump, then it is that the constitution suffers; there is a demand made

upon the mass of circulating fluids, which must be replaced before the heart can recover its proper balance in the system. Apply this to the uterus, and we shall consider the blood as belonging to the gravid uterus, and not to the circulating system. This is what is in the practice of physic called an immoderate discharge of the lochia. Such hemorrhages frequently arise from the cord being pulled with too great violence, by which the placenta comes to be injured; and this happening when the uterus is not disposed to contract, the vessels will for a time remain exposed and bleed. This is the reason why it happens so frequently in the hands of bad practitioners, as midwives; and that it is so rare when no improper treatment is adopted in regard to the placenta.

Now supposing the hemorrhage yet remains, that is, after the uterus is emptied, the child is born, and the placenta come away; what are the means next to be employed to restrain the hemorrhage? the application of cold, and the abstraction of heat in every possible way; we should take the clothes from the bed, leave nothing but a sheet to cover, and that from motives of decency alone. If there be a fire in the room, it must be put out; the windows kept open to preserve a cool and fresh air, and if the patient be faint she may have a cup of cold water.

Cold water and ice are the proper applications both to the parts themselves and the body round them. The coldest water made colder by throwing two handfuls of salt into a couple of quarts of it, may be used by cloths many times doubled dipped in this, and laid over the back and abdomen; besides which, we may with the greatest advantage expose the body to a great degree of cold if it can be done.

If these means do not answer, we must introduce ice into the vagina, or even uterus; this will often succeed; if this be ineffectual, we must as the last resource plug up the vagina with lint or tow, or something capable of entangling the blood; for while there is a clear channel there will be no coagulum formed. If the flooding still continue, the best plan is that of carrying something permanently cold into the uterus itself; a large dossil of lint dipped in the cold solution will carry up a great degree of cold, but the best thing is to carry up a piece of ice, and allow it to thaw in the uterus. Dr. Baillie, of New York, was the first who introduced the use of cold applications here; he was in the habit of using a ball of snow for this purpose, which often stopped it directly, when nothing else would. Ice being introduced into the vagina, will often prevent abortion; this then is the best and last remedy in floodings; if none of these things will stop it, there is nothing else that will.

After the hemorrhage has ceased, the patient will be so reduced, so exhausted, the action of the heart so weak, and the quantity of blood circulating so deficient, that our first care must be to supply the waste, and remove the greatest danger, which is that of the patient's having been exhausted beyond the point at which the constitution is able to rally, and recover itself. These cases must be supported and stimulated; boiled milk with grated crumbs of bread in it, must be quickly cooled by spreading it on a flat dish, and when cool may be given as one of the most nutritious things that can be had; or good broth in which the grated bread is mixed; and if these remedies do not stimulate the heart and arteries, the probability is that the patient will die. In many of these cases the best stimulant is the volatile alkali, next to which brandy and water, the ammonia is preferable, because although the first effects of the spirits is good, it produces too much heat in the system at large; while that effect never arises from the volatile alkali. It is sometimes two or even three hours before we can leave such a patient in the certainty of her living.

After the flooding has stopped, we are not to consider the patient as safe. The fever coming on about the third day may be troublesome; nothing is so efficacious for it as the saline draughts, with laudanum to the amount of a grain of opium in the twenty-four hours. Immersing the hands and feet in warm water to about 80° Fahr. is useful; it brings down the pulse, and does a great deal of general service.

After flooding, another circumstance requires attending to, a throbbing of the head and loss of memory, which will remain for weeks: in such cases there is nothing so good as purging, although the cause of the complaint be hemorrhage. The best way is to give infusion of senna with the Epsom salts, after which a draught of the decoction of bark.

Consequences of the Placenta remaining, and its Treatment.—The general treatment of the placenta has been already explained, where nothing more than ordinary attends it, together with the proper time which it may be allowed to remain. We will now consider the consequence of its remaining, and its treatment when it does remain.

It was said before, when it remained too long, it was necessary to pass up the hand and bring it away by separating it from the uterus. Some say that immediately after the child is born we should go up and bring it away, if the same pain which expelled the child does not separate and bring down the placenta. This is said to save another unnecessary pain. It is said the uterus will afterwards contract, and all will be well. The truth is, the uterus is meant to expel the placenta as well as the child: if it was necessary to have extracted the placenta directly as the child was born, nature would have made some further provision; all the works of nature are perfect in all their parts. There is a case in Haller where it was left to nature, and remained, it is said, thirty days. We should never think of leaving our patient while the placenta remains behind. When a woman is properly managed, it will rarely be necessary even to separate with the hand. In this Dr. Hunter's practice was exceptionable; he was in the habit of leaving this to nature; he used to leave the woman upon the child's being born, desiring the nurse to put the placenta into the bason when it did come away; that was enough for him.

We should never leave the placenta in the uterus; and if we have left it two hours, we should never leave it beyond that time. It is always right to bring it away. If it adhere to the uterus, we may introduce our hand as in turning, guiding the hand by the cord; we should then separate the edges of the placenta from the uterus, peeling it gradually and carefully off. After the whole is separated, we may make a feint to withdraw our hand to observe if the uterus will contract; if it do not, we should use a degree of pressure against its side, and it will generally bring on its action.

The placenta may be retained by a contracted uterus, of which there are two kinds, one in which the uterus is as long as before delivery, but narrower. This state will depend on too speedy delivery. We must patiently overcome the contraction with our hand, and separate and bring away the placenta, as in other situations. There is

little hazard in this case, as the ready contraction gives us less reason to fear the ill effects of hemorrhage, after we have got away the placenta. The other sort of contraction is that in which the uterus may be said to resemble an hour-glass, called therefore the hour-glass contraction; this must be overcome in the same way as the other. Whenever we introduce our hand to bring away the placenta, we must take care to bring away the whole; it has been stated that a part of it has been found in a state of schirrous adhesion to the uterus: now it certainly will adhere, that often happens; but of schirrous adhesion we know nothing. However we should always do a thing perfectly: if we set out with the intention of doing it at all, we should do it completely. It is better to leave the whole than a part; because if the whole be left, most probably the uterus will contract upon it, because it is a stimulus which the uterus is able to act upon, while part of it cannot be acted upon by the uterus with the same facility.

Consequences of a Portion of the Placenta remaining.—Pursuing the subject, we come next to the consideration of that state which arises from a portion of the placenta being left. No great inconvenience seems to arise till the third or fourth day, when the lochial discharge increases and becomes more offensive; the afterpains, which generally cease about the third day, remain after that time, arising from the tendency in the uterus to throw off what it cannot get rid of. There is occasionally a shivering fit, succeeded by heat, but rarely ending in perspiration. The pulse rises to 120 or 130, the patient becoming emaciated and very pale, though when the fever is upon her she looks as if painted: by degrees the hectic flush lessens; the pulse becoming smaller, acquires a wiry hardness, and this continues: the woman becomes tender at the lower part of the belly when it is pressed upon, though it is not violent pain as in puerperal inflammation; frequent retching and vomiting now arise; and if she live long enough, hiccup succeeds to the last symptom, together with which the mouth and tongue become sore; she is at length worn out by all this, and lays down her head and dies.

The discharge becoming greater and more offensive, is the best marked symptom, and frequently causes the death of the woman. This does not strike those people who happen to attend without being practitioners in midwifery; they see the fever, which they attribute to the effects of lying-in, and they hope it will soon get better.

Inverted Uterus.—This happens most frequently in the practice of female midwives, they being more in the habit of pulling away the placenta; and they in this way invert upon the same principle that the finger of a glove is inverted when a string is passed up the inside knotted to the end of the finger, and then drawn down the interior.

In pulling at the cord it will often happen that the placenta will separate from the uterus, at the same time that the inversion takes place, and the operator is not aware of what has happened; now however this is produced, the effect is in all cases the same; it may be attended with profuse flooding, or the uterus may contract. It is lucky if a flooding come on, since it may lead to an examination, when the tumour will be felt in the vagina, and must be returned, the fundus being reduced first. It should be done as early as possible. The difficulty consists in the os uteri forming a sort of ligature behind, which prevents the return of the uterus through it. When the os uteri is before us, it is easily dilated; but when we have to work through a substance to it, the case is changed.

Sometimes hemorrhage will take place early after delivery; and whenever it does we should always examine: there is no difficulty in examining, and it ensures the safety of our patient. If we know of the case directly as it has happened, and we return it, there is an end of the mischief; but if we neglect to ascertain its existence, till the next day only, we stand a very fair chance of losing our patient; it will be hardly possible to reduce it, unless attempted directly.

It is, then, of the utmost consequence that the practitioner be careful in extracting the placenta: and that he never pull the cord forcibly till upon passing his finger up the vagina he feel the root of the placenta; for he may be then satisfied that it has separated.

Reviewing then what has been said upon this division of labours, we find that it comprises difficulties of two descriptions: the one resulting from what has been called cases of arrest or of impaction; and the other from merely collateral circumstances. It is rarely that the aid of instruments can be of service, or ever employed in the latter description; while they may very frequently be of the utmost assistance in the former. We call it a case of arrest when the head has got down into the pelvis and remains unmoved, not because there is too much resistance, but because the woman is too weak for any further exertion. The state of things in arrest is very different from that which happens in impaction: in arrest we find the head not compressed, nor the scalp drawn into folds or swelled; the stools come away naturally, and the woman makes water easily: and with regard to the constitution, it is languid and weak; in short, she is a very debilitated woman. What then will be the consequence, from this view of the case? Is the woman likely to overcome the difficulties now the powers are worse? No. Is there any danger with regard to the constitution? No. While there are a number of little pains which last four or five days, is it right to leave a woman? No. Then why not deliver her with forceps, in which there is no danger; it is only bringing along the child, while the mother has not power sufficient to do it herself. In a case of impaction, the powers of a woman may be as good as those of any woman in the highest health. But there is a resistance which cannot be overcome, so that things are very differently situated to what occurs in arrest only. The bones of the head are wrapped over each other, the scalp is swelled and wrinkled, and is so altered that upon any person feeling it who had never been at a labour, he would guess it to be any part but what it is. If it be a genuine case of impaction, the head will be locked in the surrounding parts, producing a stoppage of the evacuations of stool and urine; so that on this account it would be clear that the head filled the aperture of the pelvis.

In the next place we must attend to the constitutional changes: for the first twenty-four hours after being taken in labour, the woman works away very vigorously; while during the last twelve hours, the labour will hardly make any progress, and she is sweating extremely; this state will at last change, it will gradually sink down to a mumbling, half delirious state, wandering and low. No woman should be allowed to go into this state; and if she be in such a situation, she should not be allowed to remain in it. For if the pressure of the vessels upon the brain be

allowed to continue, she will become apoplectic. Besides, there will be harm done to the abdominal muscles. What good will be done by allowing the woman to deliver herself, if the vagina and the bladder slough with the parts around which is another thing that may happen? In a consultation that was held on a case of this kind, it was agreed that nature certainly should be able to deliver the woman; she therefore was not interfered with; she did deliver herself, but lost her life for it; she died, and that at a time when an ear was to be felt, which certainly was a piece of barbarity.

It is safe to assert that if, after we are able to feel the ear, the woman is not delivered in six hours, we ought always to deliver with instruments. We know that in strangulated hernia nature has, in one case out of fifty thousand, made an artificial anus through the side after the parts themselves had sloughed off. But are we for that reason to avoid operating for the strangulated hernia? are we to leave the patient to the powers of nature? There is not any difference between pushing a man into the water, and not helping him out of it if we see him drowning; neither in the same way is there any difference between destroying a woman purposely, and the neglecting to employ those means, which, when she is in danger, will certainly save her life. There are many other cases, in which the forceps may with propriety be used: hœmoptoe, syncope, flooding, presentation of the navel string, rupture of the uterus; all these occurrences justify their application, provided the case is within the power of management by these means, either forming impaction, or arrest.

We proceed therefore to examine into the origin and nature of the instruments usually and advantageously employed on such occasions.

ORIGIN AND USE OF INSTRUMENTS.

Sometime towards the latter end of the century before last, two instruments were invented; the vectis and the forceps. The vectis is what the name implies, a lever which is intended to assist the delivery of the child's head. The forceps consists of two levers joined to each other in such a way that the fulcrum of each blade is found in the opposite half of the instrument.

In employing a lever there are three points to be considered, the point of action, the moving power, and the fulcrum or intermediate space between the two. In using, then, the vectis, the point of action is the head of the child. And here it is too obvious to need mentioning, that the force applied by the instrument must be equal to the resistance, if not superior to it; and then the mischief may arise to the parts of the child's head so acted upon, producing much injury: the ear may be injured; the lower jaw or zygomatic process of the temporal bone may be broken; or any part of the surface from the pressure may slough off: these evils are by no means imaginary; there are various instances recorded of each of them, and that under the hands of the most careful and dextrous men. When an instrument of this sort is used, it is proper to make the hand the fulcrum on which it acts: now if the force required be but small, this may certainly do well enough; but where great force is required, this is a very bad support; besides the bony parts of the pelvis lie so convenient, that we may rest our instrument on almost any part of it; yet we should recollect that whatever part we convert into a fulcrum we injure, more or less, according to circumstances: if we apply it over the symphysis pubis, we press upon the urethra; or if in other situations, we shall injure the clitoris, or vagina.

Wherever we find the ear, over that part is the application of the instrument to be made. The injury done to the soft parts will be greater in proportion as we attend less to their safety than to that of the perinæum. The integuments suffer again, if we attend to the fulcrum, by which we get a lacerated perinæum. So that we either cannot use much force with the vectis, or, if we do, it will be to the certainty of doing much mischief. All these circumstances will depend, however, on the smallness of the difficulty to be overcome; and if there be no great danger, there will not be much difficulty or pressure.

The forceps has many advantages which are of some consequence to mention. The forceps has thinner blades than the vectis, and one objection against the use of this last instrument is, its being so very liable to do harm at its point by pressure; while another objection is, that as the force is applied higher up, so it makes the head flatter in proportion, and increases its volume in the direction in which it should be lessened. In the next place, if we consider the vectis, we find that whenever its pressure is applied to the upper part of the pelvis, it must increase the volume of the head applied to the lower part of the pelvis; while we know that the forceps, so far from increasing the size of the head itself, is capable of compressing the head in such a manner as to bring it into a less compass than before; so much so, that the head included in the blades of the forceps shall altogether occupy less space than was before occupied by the head alone. It may here be objected, yes; but the head is compressed by this means. Yet granting that it is, we know that at the same time the child is able to bear that compression without the least injury. Besides the practice is justifiable upon other grounds than that of the pressure not hurting the child: for supposing that it did hurt the brain, no more force is used than what is necessary to bring the head along the cavity. It is only compressed to the size of the pelvis, and at any rate it must come through that cavity; therefore it must inevitably suffer that compression, whether conducted through by instruments or forced through by the labour pains of the woman herself. There are cases where the head being actually too large for the cavity of the pelvis, would never get through by the exertions of the woman alone. What is to be done? if no other resource be at hand, we must open the head: but here the forceps present, to save the child's life by the compression they are able to make. The truth is, that the brain of an infant will bear pressure, very well; so that as far as this goes, the forceps may all be very safely applied. We see that they do not act by any partial pressure, and that the action is diffused.

Another objection to the use of the vectis is, that it requires one of the hands to be employed as a fulcrum, in order to prevent injuring the soft parts against which it would otherwise rest: and while the hand is so employed, the perinæum is neglected to the hazard of its being lacerated; and if we choose rather to take care of the perinæum, the soft parts are violently pressed against the bone, by which they suffer great pain and injury.

The forceps consist, as we have already said

of two levers joined to each other in such a way that the fulcrum of each blade is found in the opposite half of the instrument; and now having two levers united by a joint, we need not look to the pelvis to furnish the fulcrum, neither need we neglect the perinæum. There is still a query, that if the forceps be so much better than the vectis, how is it that the vectis is still in use by some? for no other reason but because it is easier to use; for one instrument requires less skill than two, and for that reason it is preferred by those who have not more skill than they know what to do with. They say they think it is best, and with them so it is. The man is simple, the instrument, therefore, should be simple. The complex instruments are safer in the hands of those only who have learned all the uses of them, as well as the modes of managing them. Though as to instruments of every kind, the knowledge of them can never be taught; they must be used, before the management of them is acquired. It is only learned by practice; just as the habit of stopping the notes correctly on a stringed instrument of music.

In the application of the forceps we must first learn the state of the pelvis; if that be narrow or deformed, we next calculate whether the head can pass; if it be too small, the forceps are useless. It is best never to apply them, but when we are able to include the whole in the grasp; to ascertain we should examine, and feel the ear; when we can feel an ear, the head is within the cavity of the pelvis. The reason why we know the forceps may then be applied is this; we know the instrument to be so much longer than the finger, that if from the os externum the latter is able to reach the ear, the former will effectually encompass the head. The next thing after feeling the ear is to ascertain the exact position of the head, which being done by examination of the sutures and fontanelles, we judge whether a change of position in the head might not enable the woman to expel the child by her own powers alone; and if we find ourselves unable to turn the head round, we may then apply the instruments to it as it lays; first feeling for the occipital bone and fontanelle: and if in examination we be able to feel the posterior fontanelle, we know that the occiput must be somewhere in the range of the pubes, which will be more precisely determined by the direction of the sagittal suture.

Supposing this known, the instruments are to be applied, the convex sides of the blades to the cavity of the sacrum so as to accord with the direction of the axis of the pelvis. Before the introduction of the forceps, it will be necessary to dilate the parts gently, especially if it be the first child. The blades of the forceps must be greased before being passed, to ensure an easier passage, and then one blade first is passed gently up between the finger and head of the child; because by this means we are certain no soft parts can be injured or pinched by it; further than the finger will reach we must depend on the proper direction of the instrument, which should at its point be pressed towards the centre of the head, and passed forward with a gentle riggling motion, which serves to form itself a space between the uterus and head, taking care also to keep the handle of the forceps outward, so that we may assist our intention of keeping the point of the blade close to the head. In carrying the instrument up, we should always put the woman upon her guard to warn us if we give her much pain, because if we do, we know that we have pinched the uterus, and should then withdraw the blade a little way and then return it till we get as far as necessary without much pain; which being done, the other blade is to be introduced in the same manner; which is easily accomplished after the introduction of the first. Both blades being introduced, the instrument is next to be locked; and it is convenient to pass the finger several times round the lock, to see that no hair or skin is included which might give some uneasiness to the parent at the time of using the instrument: and before beginning to operate it will be as well to take the forceps and give them a sort of vibration or shake, that we may feel that we have the child firmly by them. We should then explain to the patient that every thing relative to the application of the instrument is done; but that she must not expect our assistance will give her no pain, for it must give pain, though less than she would feel in her attempts towards expulsion while unassisted. It is not possible to bring the child into the world without pain.

Now we must remember that labour pains are not continual; therefore we must not use the forceps as if they were. The head will not bear constant pressure, therefore we must desist every now and then, beginning with the least possible force that is of any use, which may be easily increased as may be necessary. We should rest frequently, and from time to time go round the head with our finger to see how the business comes forward; always satisfying ourselves that the instrument still encompasses the whole of the head. The motion we make with the forceps must be slow and gradual, inclining them very gently from side to side, or from blade to blade; always acting in a line with the axis of the pelvis, till we can feel the occiput, when we move with regard to the axis of the vagina; using in the latter part of the operation very little force, for the head requires very little force to bring it through the vagina.

Deformed Pelvis from Rickets, or *Mollities Ossium.*—In both these diseases the cavity of the pelvis, that it is impossible for the child to be brought down it whole and alive by any means: and hence when we meet with deformity from either of these sources, our first question should be whether there be space enough to allow the child's head to pass? If the space is above three inches, it is sufficient, and the head may pass. Where it is less than three inches it is not sufficient, and the head cannot pass; the question is then changed, what method have we to bring the child out of the body, if it cannot pass through the pelvis? And here has been proposed to cut it out from the body, by the following operation.

Cæsarean Section.—This has been performed in two ways, by an incision obliquely carried through the side; or through the linea alba directly down. The object proposed in this operation is to save the life both of the mother and child. It is of great antiquity. It is said that Julius Cæsar was taken this way out of the body of his mother; but there is no just ground for believing such a report: many historians held him as so remarkable a man that they were determined he should not come into the world like any other person. If it had been so, is it not strange that Pliny, who wrote so soon afterwards, should devote a chapter entirely to the history of a living child being cut out of the body of the parent who was dead, and yet mention nothing of Julius Cæsar having come the same road? Scipio Africanus is said to have been introduced by the Cæsarean section, but there is no reason to believe

it. It was never known otherwise than as an operation recommended till the sixth century in Paris. It was also once performed in Holland by a sow-gelder upon his wife. It is remarkable that the same woman was afterwards pregnant; but when her husband proposed the operation again, she declined submitting to it, and was delivered without. The surgeon who strongly recommended it in Paris was Rousset, who never lived to see it performed, on account of the opposition he met with in opinion from Ambrose Parée and other eminent surgeons.

The manner of performing this operation has been much disputed: the lateral incision appears to be the best; because we divide one muscle and it retracts, we divide the muscle under it and it retracts also; but the whole of the incision will not be a direct line through, so that we stand a better chance of saving our patient, as far as exclusion of the air may have a good effect, when the parts come afterwards to unite.

Of the two plans of performing the operation the lateral incision appears to be the best; and in making it we must attend to the following points: the woman may die under the operation itself; or shortly after, from the loss of blood; from exposure of the cavity of the abdomen causing extensive peritonæal inflammation; from the parts suppurating instead of uniting by the first intention; or from inflammation being so violent as to prevent the formation of matter, producing mortification. Yet if we look at the cases of this kind that are recorded, we shall see the fairest accounts that could be written, the death of the patient never being attributed to the operation, but to some trifling cause, perhaps relating to diet; such as a small glass of wine, or a few grapes producing inflammation of the peritonæum, or diarrhœa. This is decided upon without considering the probability that the diarrhœa or peritonæal inflammation may have been produced by the operation alone. These things should be considered fairly, and not viewed with the partial eye of him who has performed the operation. We see that on the continent this operation has been very rarely successful, according to Bourdelet, not in one case out of ten; and when we enquire how often it succeeds in our own country, as more nearly concerning us, we find that it has uniformly been fatal, that is, that all the patients have died from it; there is not a single solitary instance of recovery. It has been performed in London, Leicester, Edinburgh, and Manchester, by the best surgeons of those places, and there are none better in the world; but all the patients have died.

Nevertheless whenever the operation is performed, it should be done with a view of preserving both lives, because it is a safer way of delivery to open the head of the child. In mollities ossium, indeed, the disease is continually going on; no case recovers; it always destroys the woman. And here it is certainly advisable to perform the Cesarean operation, though not with the hope of preserving both lives; but that the woman is hardly more sure of dying after the operation has been performed than she was before.

In all cases of mollities ossium, then, the child being ascertained to be alive, the Cesarean section should be performed; in all other cases the life of the child should give way to that of the mother: and the head should be opened.

Signs whether the Child be alive or dead.—From the reluctance that every one must feel in opening the head of a child, it will be still a satisfaction to us to know whether it be alive or dead. The marks then are these: in the first place, supposing the child is alive, the pregnancy of the mother will continue to increase to the end of her time; and in labour the presenting parts will have a firm elastic feel; the cuticle and hair will not come away on the finger: besides which there will generally be a pulsation at the fontanelle. But the navel string being pressed, may cause death; it may arise, and does often arise, without any cause that we are able to trace. We know that a child may die in utero from affections of the mind in the woman. The death of the child may be known by shivering fits preceded by a sense of coldness in the abdomen. While the child is alive, it assists in supporting its own heat, but when dead it necessarily must obtain a degree of heat by robbing the mother of part of the heat in the parts around, which explains the sense of coldness that is felt. The breasts, while the child is alive, increase, and continue firm and well supported; but when the child dies, they immediately become flaccid and empty. So that a woman frequently used to miscarriage will foretell its approach by this alone. While the child is alive, it gives the sensation of a living weight, a weight which is capable of adapting itself to the different positions of the mother; but when death deprives it of this power, the woman feels it flap from side to side according to the way in which she moves. She becomes sensible of weight to a much greater degree than before. Besides all which, there will be the cessation of motion in the fetus, which is always perceived by the mother some months before delivery. These are so many signs of the child's death, which may be observed, before labour comes on.

There are others which accompany labour: first, as the child is dead, the membranes will be dead also; and for that reason will break earlier than they otherwise would. It has been said, that the liquor amnii being turbid, points out the child being dead: but this circumstance sometimes arises while the child is alive and well. The strongest sign is one by which we may tell it before even we see the woman; it is by the waters being corrupted. The smell of putrefaction will sometimes decide the opinion of an experienced practitioner the instant he enters the door; also in an examination, from the meconium coming away on the hand, in consequence of the sphincter muscle being putrid and relaxed. The sutures of the head vacillate like bones in a bag. When we examine, the hair and cuticle will come away upon the finger.

When all or even the greater part of these signs are united, there can be no possible doubt that the child is no longer alive.

In what Cases the Child's Head should be opened.—These cases are syncope, convulsions, hæmorrhage on the part of the mother; hydrocephalus internus on the part of the child. This last disease may be ascertained by examination, the sutures and fontanelles being at a greater distance than they should be, and the whole cranium very imperfectly ossified: but the most unequivocal evidence is the head's not entering the pelvis; by which we know that the head is too big for the pelvis, or that the pelvis is not large enough to receive the head into it, which is the same thing in effect.

When all the stages of labour are gone through, and the head is not advanced, we are led to examine and find out what the state of the child is. When we have ascertained the existence of a de-

formity of pelvis, we may generally tell the space left for the child's passage, by passing the finger from before backward; that is, from the vagina; the space under the arch of the pubes, backwards and rather upwards, toward the projecting front of the sacrum, where the first lumbar vertebra rests on it. Now in a well-formed pelvis this cannot be done; it is not possible to reach the sacrum in this way; but in a deformed pelvis we may ascertain the space pretty accurately: when the distance between the projecting part of the sacrum and the symphysis pubis is upwards of two inches, the delivery is very simple; it would be well if it were less so, as then it would not be so frequently adopted as at present. Many a practitioner has sacrificed a child's life at the shrine of his own ignorance. It is much easier to apply the perforator and open the head of the child, than it is to apply the forceps; in the latter some considerable skill is required, in the former none.

In what Manner the Head is to be opened.—The necessity for this operation being manifest, we must proceed as follows. First empty the bladder, then throw up an injection, that the rectum may be also cleared; next introduce the hand into the vagina up to the os uteri, upon which we are to pass up the perforator, guarding the point with the utmost care, while passing it up, by means of the other hand purposely introduced before the instrument. The points of this instrument are guarded by stops, by which, when we push the points through the child's head, we avoid the danger of their passing too far, and, by coming through the opposite side of the head, of wounding the uterus. The way they are used is this: we bring the points upon a suture or fontanelle, recollecting that when they are introduced, the handles are close together, and consequently that both the points form one perforator: now when, by the hand in the vagina, we have laid the points opposite the part of the head we intend to open, we press the instrument down with force sufficient to make it pass through the integuments: which being done, and the perforator pushed in up to the stops, we are next to lay our hand between the handles, and press it up between them to the joint. The effect of this will be, by its acting as a wedge to force asunder the points, and to dilate and tear open the sides of the wound before made; we next close the sides of it and change its position, so that the handles will have their rings in a horizontal position; we then open the instrument again as before, which gives us a cruciform opening. This being done, the perforator is next to be pushed into the head, and screwed round backward and forward, so as entirely to break down the consistence and connection of every thing within the scull; this will generally be sufficient, the pains will quickly press out the cerebrum, which may be removed from time to time; or we may scoop it out with a table-spoon.

If the pelvis be not greatly deformed, the delivery may now soon be effected; if it be, we proceed to remove the bones piecemeal, taking care to guard each piece through the vagina by laying the scabrous edges of it against the hand, which during the whole operation should be in the vagina. The sides of the two points of the perforator which come against each other, when the instrument is shut, are made rough, so that as with a pair of pliars we may take hold of a bone which is too large to pass, and break. In this way we must bring away the frontal bone, and occipital bone; the temporal bones and the parietals; after which, in order to have a firm hold, we should lay the scalp as far over the parts within as we can, making a sort of flap to lay hold of. It is best to put on a glove well greased in order to catch hold with. It will sometimes answer very well to carry up the blunt hook, with which we may occasionally be able to catch hold somewhere so as to have a good purchase; but it is very apt to slip, as it has no point. If it do slip, we can then only pass the crotchet; in the construction of which we should observe that the flat point, at its sharp extremity, looks inward; so that if laid to a surface parallel to it in direction, it will not be able to peck into it, or wound it. When using the crotchet, we should begin with as little force as may be attended with a good effect; since if not sufficient to bring down the head, it may be easily increased; recollecting that whenever this instrument is using, we must always keep that hand which is within the uterus directly opposite the beak of the instrument, so that in the event of the parts of the child giving way no accident may happen to the uterus. We should use a force that we can command; and if the pelvis be of sufficient dimensions, bring the body down without removing any more than the head; for when once the head is delivered, the body will soon follow, as it is easily compressed.

Where the deformity is very great, and the passage very small, we should begin to open the head very early in labour, puncturing whatever part we first reach by a hole drilled up to the stops. We should then cease, and trust in some measure to that putrefaction which the moisture and warmth of the parts will be sure to produce instantly. This putrefaction will proceed very rapidly; and the bones, and indeed the whole body, will come away easier, separating from each other with infinitely less force than before they could have done. When the patient cannot be left longer with propriety, after about thirty-six hours, we may proceed to bring away piecemeal the various bones of the cranium; the temporal, frontal, occipital, and parietal bones; after which the remaining part of the head will only be the basis of the skull, which admits of being placed in a more favourable position for passing through the pelvis; for the parietes being carefully laid over the bones whenever they may be felt exposed, it will protect the uterus from injury, and then if the remains of the head be brought forward, and doubled down with the chin to the breast, it will, in this state, be frequently capable of being delivered. This sort of labour is very tedious; it lasts a very great length of time: but it requires no skill. We must be aware, that when we have brought the head down, we must not always expect the body to follow as in other cases, but shall sometimes be obliged to bring away the whole child by pieces. It may be necessary, in order that the body may pass, to take out the heart and lungs, and every organ one after the other. All the caution that need be given is to take care not to injure the woman, in doing what we are about, neither in separating the parts nor in bringing them away.

On facilitating Labour by turning the Child.—It will sometimes happen that in spite of a slight deformity of the patient we have a chance of saving the life of both the mother and the child. There are two modes of attempting to do this: the first is by turning the child, which will also apply to other cases as well as deformity of the pelvis; the second by bringing on premature labour.

Turning is not the best of the two resources, but many women will submit to this, who will not

submit to the proposal of bringing on premature labour.

After turning a child, we may pull it though by the feet, while we never should have been able to have delivered it without, for the uterus would not have been able to push it through, in the common way of presenting with the head to the os uteri; and if we are able to save the child's life it is a grand point. If after we have brought the feet down, the head will not pass, even then we are only where we were at first, and can open it.

On bringing on Premature Labour.—The operation that is certainly the best method of managing delivery in deformities which admit of it, is premature labour, which is founded upon these positions; that during pregnancy, the head of the child is increasing in size, to the time of delivery; so that if we take them in their gradual increase of size, it is pretty plain, that one in the early months of pregnancy would pass with ease through a pelvis that would not receive it at a later period; and in this way, by considering the case in all its parts, comparing the diameter of the pelvis with the size of the head at different periods of the pregnancy, we shall be able to calculate the time when we may bring on premature labour, fixing either the seventh month, seventh and a half or eighth month but never later, for if we do, the head will be too much ossified to submit to the pressure it must sustain, with that ease which is necessary to the delivery being perfectly safe. It may indeed be brought as early as five or six months, but the child then cannot be expected to live; and if it be produced later than eight months and a half, the labour will be as difficult as that at nine months.

The first step towards bringing on premature labour is to carry up a male catheter, through the vagina to the os uteri, and to introduce it with care, in such a manner, as that the point of the catheter shall be in contact with the sides of the uterus, using a gentle pressure only. When the extremity of the catheter is against the membranes, but clear of the child, the instrument is to be thrust forward, so as to break the membranes; and in this the catheter is preferable to a rod of silver, since as soon as the catheter enters we know the object for which we introduce it is gained; for while the instrument is still in our hand, we shall feel the waters passing off more or less; while if a solid rod be employed, it may be necessary to introduce it a second time. In puncturing or breaking the membranes, it is also preferable to get the instrument some way up the side of the uterus, instead of breaking them immediately upon the os uteri, because in the latter way the child is most frequently born dead; which depends on the different effect with regard to the flowing off of the waters, produced by the mode of puncturing or breaking the membranes.

The breaking the membranes at the side only allows a partial escape of the waters, quite sufficient to produce a disposition to contract in the uterus, without permitting any injurious effect to arise from pressure; while on the other hand, when they are broken in the front, the whole of the waters flow away, the uterus contracts very strongly round the child, and the circulation generally suffers, and is either partially or completely interrupted. Delivery, by bringing on the action of the uterus prematurely, is for many reasons very estimable: a month or two before delivery naturally produced, the head is not only smaller, but more compressible; there is a less proportion of bone; so that if we take two heads of the same absolute size, one being of eight months formation, and the other seven, still that at seven would have the advantage in passing through a narrow pelvis. It is difficult for any one to determine the time which should apply to different pelvises; but where the distance between the pubes and sacrum is under three, yet all but three inches, eight months may be allowed; where the distance is two and three quarters, seven months; and so on. Yet when a child is born at seven months it will rarely suck, and requires the utmost attention to be reared. By these means, then, we may be able to save both lives; by the Cesarean section we certainly lose one life; and by doing nothing we lose both.

Preternatural Labour.—We now proceed to a consideration of the third class of labours to which we have divided our subject, and which are generally denominated preternatural, or cross-births; including all presentations but those of the head. This class is naturally, therefore, divisible into presentations of the lower and presentations of the upper extremities: and to this subdivision we shall adhere.

We know little of the cause of preternatural presentation: perhaps it depends on a peculiarity of form, either in the uterus or pelvis. It is said to arise from accidents, because there are more instances of it in the lower walks of life: that is very true; and there are more aquiline noses among the poor people than among the rich; and more noses of every kind, because the truth is, there are more individuals in one class than in the other: preternatural births are most likely the effects of peculiarity of shape in the parts. In this kind of labour sometimes the lower extremities present, and sometimes the upper. We shall treat of each presentation.

Presentation of the lower Extremities.—Now this division of labours is capable of being finished by the powers of nature alone; and the only consequence would be upon the child, to whom such delivery is not always safe, for when the feet present, and the child is gradually expelled, the child in figure forms a cone, which all along increases to the shoulders, and the head is born last of all; the navel string would be born long before the shoulders were disengaged, the effect of which would be that the circulation would be interrupted in the cord, and perhaps suspended; for pressing the navel string before birth, is the same as pressing the throat after it; each produces death. After this observation, we have only to remark that when the cord comes down by the navel passing through, a portion of the cord should be drawn slack after it, that it may not be stretched by the child's passing under the pubes.

When the feet or breech have presented, there is plenty of time to turn the occiput to the pubes long before the head is down. Whether one foot or the breech presents, it is better to let it come so, than to go up, and bring down either one or both feet; because in breech presentations, the parts are gradually and well dilated before the cord is likely to be compressed; therefore it is safer; besides the inferior extremities in breech cases lie upon the sides of the abdomen, by which they protect the navel string lying between the two from any pressure whatever. So that we see all breech cases should be left unturned; and we may ascertain the breech from the head, by feeling the parts of generation, as well as various depressions without that uniform defined resistance

which is given by the head. When the breech presents the meconium will generally come away by the pressure squeezing it out of the abdomen. Suppose that in a breech presentation any accident happen to the woman, needing immediate delivery, it has been said that the forceps may be applied; but from frequent trials we can say that they are of no use; they are not calculated to hold such parts, and always slip off. Another plan recommended, is to get a handkerchief between the thighs and the body: this is an exceeding good purchase, but in the living subject we can scarcely do it, we cannot get it between the legs and the body. If neither of these plans succeed, there is only one remaining; this is the carrying up the blunt hook, and so placing it over the thighs; this certainly commands the delivery, and where a small equally applied force is sufficient, it will be both successful and safe; but as it is self evident that iron must be always stronger than bone, there will be a great risk of breaking the thigh bones by this instrument. Yet the woman is not to die to save the child's thigh-bone from the risk of being broken; and it is certainly better to have to treat a child with its thigh broke, than one whose brains have been all scooped out. We should however be careful never to employ the least unnecessary force.

The feet being born and the breech passed, the part which next presents is the umbilicus; and as the body afterwards passes further down, the cord will be both pressed and dragged, and if a cylindrical yielding cavity be dragged, the cavity of that cylinder is diminished in its calibre, and the tube will ultimately be obliterated; so that the best practice will be, as soon as a part of the umbilicus can be felt, to pass up the finger and bring down sufficient to prevent its stretching in the progress of the expulsion; and as soon as the head is in the pelvis, to bend the face down, bringing it forward upon the breast of the infant, and opposite the os externum, by which means the child will commence breathing; and if the navel string only pulsates up to that time when breathing commences, the child is safe in all that regards suffocation; and as to the head remaining within the os externum, it is of no consequence whatever. If the child's head cannot be brought through, we may pull, drawing it with caution. Some practitioners will pull the child very hard, which is quite improper, not that it is any material object to the woman, but to the child, the force being applied with the hopes of the child's being born alive; but is it very likely that its life will be saved, after a leg or an arm is pulled off, or after the body is pulled so hard as nearly to be separated from the head?

Presentation of the upper Extremities.—The other division of this class of labours, is that in which the upper extremities present. This is now and then an original presentation, but sometimes it is artificial. It may be called original, if felt before the membranes be broken in the absence of a pain. It may be called artificial, when the hand being felt by the practitioner, perhaps with some other part, it is drawn down though the os uteri, and the position of the presentation varied; though it originally was a head presentation, it may be made a shoulder presentation. When the hands are at the os uteri, they are easily distinguished from the feet, by the thumb not being in the same line with the fingers; while in the foot we distinguish the toes and heel. The shoulder has been mistaken for the back, and it is a mistake easily made in practice. In distinguishing, we should recollect the superior extremities have the scapulæ behind them, while at the breech we feel the organs of generation. We may here lay down a rule which is of the greatest consequence, and applies to all kinds of practice in midwifery; that is, that the shoulders and arm will never pass together: the labour may continue, but if that presentation be not altered, the woman will be worn out and die. We must return an upper extremity; and never regard it as a matter of choice, but as a rule of practice, which must always be adopted. We must turn, because it is a presentation that cannot be delivered. This altering the position of the child, in utero, is called the art of turning, which art, in modern science, is attributed to Ambrose Paree, though it is mentioned as far back as the time of Celsus, who says it is sometimes necessary; he does not, however, say whether it were ever done on a living child. Ambrose Paree's words are, "that in all cases where the upper extremities present, you must turn and bring down the feet; and if the midwife cannot do it herself, she must send for a surgeon who can."

The nature of these presentations may vary so much that it may be necessary to mention some circumstances. Suppose a case in which the waters are not yet discharged, and the labour is going on very naturrally, but by examination through the membranes between the pains, we find that an arm or shoulder presents, yet we may, perhaps, not know exactly the parts; in such case we should not be absent from the woman upon any account at the time of the membranes breaking, for it will make all the difference in the world, as relates to that labour. We must ascertain the exact position of the child, and we must then proceed to turning. The question now is, what time in the progress of the labour is most proper for this operation? Bourdelois says, when the membranes are broken, and the os uteri dilated. Dr. Hunter is of the same opinion. Dr. Clarke differs from them both, and justly; for he found that if we delay turning till the waters have come away, and the os uteri is quite dilated, we allow it to remain to the increasing the difficulty of the operation. If we take it when the os uteri will admit the finger and knuckles, it is the better time, because we then turn the child as it in a bucket of water; and this gives us so clear an advantage that it needs no explanation. This then is the most convenient period, and we should begin by dilating the os externum, previously intimating our design to the patient, cautioning her not to be in the least frightened at what we are going to say; we may then inform her "that the child does not lie quite right, but it may soon be set right, and with little trouble." It being then agreed upon, the woman is to be laid close to the edge of the bed; and we roll up the sleeve of our shirt, and pin it, anoint the hand and fore arm, and dilate by forming our hand into a cone, first going gradually through the os externum, taking our time, and being very gentle; but we should not pass on dilating beyond the vagina, until our hand passes easily through; if we do, we feel the inconvenience of it afterwards, by the contraction of those parts: having got our hand though the vagina, we may let it remain a while, and should a pain come on, it may waste itself on our hand. We should then gently begin again to dilate, till we get our hand into the uterus, when we turn the child gradually round, bringing the head to its proper situation.

There is no difficulty if we once get our hand

up through the os uteri, that being dilated sufficiently, without the membranes being broken. But suppose another labour, where the membranes are broken without the os uteri being dilated. We have here much more to do, and less chance for doing it well than we had in the other example; we must go on, and have to turn the child too, under the increased difficulty of the contraction of the uterus, which will not indeed be violent, but quite enough to render the turning difficult. But if we be able to manage the most easy case, and the most difficult, we shall be equal to all the surbordinate or intermediate degrees of difficulty that may be met with in turning.

To give an example of the greatest degree of difficulty, suppose a case, where the waters have been lost twenty-four hours, two days, or even three. What we have to do in overcoming the contraction of the uterus is not altogether a matter of difficulty as to skill, so much as it is as to time and management. With a view to lessen the difficulty, opium has been given, but great caution is required in its exhibition; since the woman has been known to die from the use of opiates, she has been drained to death by uterine hemorrhages.

The last circumstance necessary to notice with regard to preternatural labours, is that all the other parts being brought down, the head sometimes cannot be got through well. We may here use a moderate force, by pulling with the body, remembering that our object in using force is to save the life of the child. Besides, why should we use a force too great, when we may always deliver with the forceps? though where violence is unavoidable, it is best to open the head.

To employ that force which, without violence, may assist in bringing away the head, a good method is to make a sort of loop, by bringing a handkerchief loosely round the neck; when letting the ends down upon the breast, we tie them rather low on the breast, so that there may be plenty of room to place our hand within it to pull by; and if we succeed, we must mind, that in bringing down the head, we depress the sides of the head, so as to bring it into the hollow of the sacrum. If it will not come by any means, we must then open it; when we have extracted the brain, we should introduce the blunt hook, and it is used with the most effect when seconded by the pulling of the body.

In some instances it happens that the head is entirely separated from the body, when various means have been recommended for bringing it away. The only sure method, however, is to open it; and when we have dilated it by the opening of the perforator, we should introduce the crotchet, before we withdraw the perforator, in order to have the head always secure from slipping, as it otherwise would do. The difficulty is, that whenever we touch it we have a smooth slippery surface, which we cannot keep, unless we always have an instrument within the hole we have made. It will roll over the upper aperture of the pelvis. We must recollect always to keep one hand in the vagina, while any operation is going on, for the extraction of any body which may be within the uterus, and in order to guard the instruments.

Disorders subsequent to Delivery—Most of the diseases consequent upon pregnancy arise after delivery, and not during labour. We shall first observe that,

Quietude and a horizontal position should be strictly enjoined as a matter of the greatest moment. And for this reason it is obvious that as the patient should not be moved early, she ought never to be delivered in her clothes: this, however, is a plan often proposed by the lower order of people to save inconvenience and expence; but it never should be assented to by the practitioner, as it is a very dangerous experiment to raise the patient to an erect posture, at a time when she may remain perfectly safe in an horizontal position. There are many instances of the fatal effects of neglecting such a precaution.

A woman after delivery should remain perfectly at rest for at least two hours, and then should by no means be raised upright, but be very gently lifted just enough to allow the drawing away of the clothes; which if they give trouble must be cut away with scissars, to prevent the risk of exhausting the patient by over exertion.

Fainting. — Fainting after delivery frequently happens, and may arise from many causes, most of which are of little consequence; it is always an unpleasant occurrence, and sometimes dangerous. It may be merely the effect of fatigue; a woman is just able to bring the child into the world, and after making perhaps the last exertion she is capable of, sinks into a faint. Frequently she will fall into an hysterical paroxsym, which will easily be perceived by her laughing, crying, sobbing, &c. which characterizes hysteria. If the fainting proceed from either of the above causes, volatile alkali rouses the patient, and nothing more is necessary; neither should any apprehension be felt for her safety.

Fainting may be the consequence of the great agitation of mind which the patient has suffered from fear of the approaching pains, and, as she thinks, dangers. In such cases nourishing things should be administered, as a small quantity of good broth, with a table spoonful of wine in it, or some volatile alkali.

Whenever there is reason to suspect that the fainting arises from loss of blood, the practitioner should never leave it to probability, but instantly examine the truth of his suspicions, not only on the surface lying next to him, but the upper part of the further thigh, as the blood will sometimes run over the side of the thigh that is farthest off; when the practitioner, not perceiving any discharge from that part whence it is generally observed to flow, has not the least idea of his patient's situation. When upon examination it is found that hemorrhage has taken place, the placenta being got away, it is to be treated in the common way by acids, &c.

In some rare instances it has happened, that immediately after delivery the patient has sunk into a permanent syncope, from which she never has recovered, dying without a groan. When there is reason to suspect the approach of such a state, the patient should be made to swallow a large dose of volatile alkali; it can do no harm, and is generally highly beneficial, let the fainting originate from whatever cause; the spiritus ammoniæ comp. and tinct. lavendulæ may also be administered; and hartshorn should always be kept in a lying-in room.

After delivery it is advisable to apply a certain degree of pressure to the parts. This circumstance has been variously received and very generally misunderstood. A certain degree of pressure is useful, but if that pressure be too great, it will occasion worse consequences than the want of pressure altogether. The pressure required is more properly speaking a support, and is of the same kind as we like to feel from a waistcoat in

winter. The intention to be had in view in making it is just the same as after tapping in dropsy, and pressure judiciously applied in both cases will often prevent fainting.

Suppression of Urine.—In the country it often happens that a practitioner does not see his patient any more after leaving her safely delivered. In such cases, it will be necessary for him to leave general directions with the attendants, the most material of which is, that the nurse shall send for him, if, upon trying, the patient finds herself unable to make water, at the distance of eighteen or twenty hours after delivery. If the patient be neglected, the bladder swells to an enormous size, and at lasts bursts, in which case death is incvitable.

When the practitioner has been sent for, he must not be satisfied with the patient's telling him that she has since made water, and that a little escapes frequently; all this amounts to nothing, and must not excuse a moment's delay in the introduction of the catheter. It will generally be necessary to draw off the water once or twice a day; but from distance of residence, this will sometimes be impossible. In such a case it is not very difficult to teach the nurse how to perform this operation, by shewing her the parts, and pointing out the little orifice, at the same time telling her the instrument must be passed up carefully and slowly till the water flows from the other end of the tube.

Effusion of Blood into the cellular Membrane of the Labia Pudendi.—This is an accident which now and then happens after delivery. It is merely a mechanical effect of pressure, and very rarely occurs. In one case where the parts had been previously much strained, the swelling was first observed by the patient's finding herself unable to close her thighs together. This blood, if left to itself, will first coagulate round the orifice of the bleeding vessel, and afterwards the whole quantity of effused blood becomes fixed. There are two ways by which the parts may get rid of this blood, if its quantity be considerable; either by the skin sloughing off, by which part of the blood may escape, or by the part inflaming and suppurating. When the latter circumstance happens, and it is determined to open it, the orifice made cannot be too small, so that the matter be allowed to escape; for the constitutional weakness at such a time as this will give a tendency to gangrene in any part which is divided. Cold is the only application that is to be at all regarded. It has been recommended to cut and scarify the part, but this is objectionable, because should the artery continue to bleed after the openings are made, the situation of the patient at once becomes serious, for we must necessarily be perfectly ignorant where the ruptured vessel is, and consequently as perfectly unable to stop it. Should it ulcerate, the treatment should be the same as that of an ulcer in any other part of the body.

Lochial Discharge.—By this is meant that discharge which follows the expulsion of the placenta, continues for several days, and diminishes in proportion as the uterus contracts. A short time after delivery the vessels which before poured out red blood will, from the womb having contracted to a certain degree, only ooze forth serum. When small pieces of the maternal part of the placenta remain with fragments of the membranes, &c. and mix with the lochial discharge, they constitute what the nurses call the green waters; and these discharges generally subside in six or eight days, more or less. They will, however, often be reproduced by very slight causes; such as sitting upright, endeavouring to walk, eating stimulating food, or indeed any thing which may increase the action of the heart and arteries. In a strong woman of tense fibre the discharge will be of shorter duration than in a weak woman of lax fibre; if a woman be quiet it will not continue so long as if she be restless. Where the quantity is profuse, and it flows for too long a period, the constitution becomes weakened, and it is necessary to give bark with the vitriolic acid, or the conserve of roses.

Lacerated Perineum.—The intermediate part of the body situated between the vagina and rectum is called perinæum; and from its peculiar situation is very liable to accident from the violence of pressure in labour: this will sometimes happen with the most careful practitioner; it will now and then give way in a trifling degree, and is in such cases of no further consequence than from its leaving the parts a little sore and weak for a few days. The only laceration of consequence is that from before backwards to the rectum, by which the os externum and rectum are laid into one, and the sphincter ani consequently torn asunder. This accident is, however, extremely rare, and may always be prevented by supporting that part of the perinæum with the hand.

In case of an actual laceration of the perinæum, the first step is to empty the bowels by a brisk purge; after the medicine has operated, the parts should be perfectly cleansed from all fœculent matter, and then the thighs should be bandaged together, by which there is a probability of the parts uniting by the first intention, and in some cases this has succeeded. Should this fail, the only chance is not to allow the parts to heal except by uniting with each other. If considerable inflammation takes place, it must be reduced by the use of fomentations and cataplasms, and of cooling laxative medicines; and if the pain is violent, opiates may be given. When suppuration occurs, bark must be administered. The dressings may be superficial.

After-Pains.—Every woman who has been in labour is subject to what are called after-pains, though they do not always occur equally. They come on at regular intervals, and are more or less violent. These pains are very rarely felt after a first lying-in; and they are less when the labour has been retarded, allowing the uterus to contract gradually behind the body of the child, than where the expulsion of the child has been hastened, the uterus then contracting suddenly but not perfectly. In consequence of these pains, and the fatigue which the woman has sustained throughout the labour, it is a very general and excellent practice to give an opiate of from twenty to thirty drops of laudanum, and afterwards to repeat it in such a diminished quantity as shall allay the irritation, but not the contraction of the uterus.

An after-pain will perhaps come on an hour after delivery, by which a large coagulum may be expelled; and after that others, by which smaller coagula will be separated; and then an after-pain as violent as any of the rest, to throw off one of the smallest possible size. To some women these are very distressing, and are borne with less patience than the labour pains, as the latter they know are for a good purpose, while the pains after delivery afford no such consolation, and yet are sometimes as violent as the worst pains of labour can be. These pains may be moderated by warm applications to the abdomen, and by small doses of laudanum.

General Treatment of Women after Delivery.—Prac-

titioners formerly had various ways of treating a woman after delivery. Of these the principal were the high or stimulating mode of treatment, and the low or starving system.

The best practice is to avoid both of these extremes, and to treat the woman entirely according to her situation; if strong and healthy, she may be kept for a few days upon gruel, barley-water, and toast and water; and then, if she be perfectly free from fever, she may eat a little animal food. But if of a weakly constitution, she may have animal food the first day; in the former case no wine should be allowed, in the later both wine and whatever else will nourish her should be administered. In general no meat should be allowed for the first three days; bread-pudding may be permitted, but if there be the least tendency to inflammation or fever, nothing further. With regard to medicine, much will depend upon the circumstances of the patient; the great object is to keep her quiet; and if this cannot be done without medicine, medicine must be given. A saline draught, either with or without spermaceti, will generally be sufficient; and at night a small dose of the sp. æther. vitr. co., which may be increased if the patient's nights are restless. It is of high importance, however, to give a purge on the third day. It is of little consequence what purgative is used as long as an evacuation is produced. For many weeks before delivery the bowels of a woman are never emptied of their solid contents; and the quantity that thus accumulates is sometimes very astonishing. Should the purge not operate, an enema should be exhibited the same evening; after which not a day should be allowed to pass without a stool being procured, and this strict attention should continue for the first fortnight.

Milk-fever rarely or never happens where proper care has been taken to preserve a regularity of action in the intestines. Where the bowels are neglected, and there is a disposition to inflammatory fever, the milk being formed in considerable quantity, will greatly increase the tendency to fever.

Sore Nipples.—This is a complaint often met with, and very troublesome, and most probably arises from an artificial mode of living. Many women use considerable pressure upon their breasts, and under such circumstances it is natural to expect that the nipples being pressed in, may be absorbed altogether; or if this do not take place, they will give way upon the child sucking, and become sore and painful. If this have occurred in a previous lying-in, the parts may be strengthened by applying to them astringent remedies two or three months before labour. When, however, soreness of the nipple has taken place, the best way to protect it is to use an artificial teat, by which the child can suck equally well, and the nipple itself being undisturbed, will soon heal. The way in which one of these instruments is prepared, is to procure a fresh teat from a heifer, and scooping out the inside, steep the skin in spirits for an adequate length of time, and then fasten it on to the glass instrument; glass is preferable, because by seeing the milk we may be assured that the child is properly nourished. A woman is capable of giving milk with a flat or even a concave surface, by drawing it out with a glass tube that has a small ball to it, by which a vacuum is produced, when immediately as the glass is removed, the child being put to the breast will keep it out by sucking till satisfied.

Where the nipple is sore, it will either be from superficial ulcers, or cracks in the skin, either of which give excessive pain and distress; and it often happens that after all manner of things have been ineffectually applied, the nipple will heal of itself. Wine, alum solution, and all similar applications, give very great pain, though they seem to be the most beneficial remedies of any that are in use. Indeed it is extremely difficult to know what will answer best: if emollients be applied, less pain will be the immediate effect; but they make the parts more tender, which, when the child sucks, will frequently bleed; and this is unpleasant for several reasons. The child probably swallows the blood, and perhaps on being sick vomits it up again, to the great terror of the nurse, the mother, and all around them. If the sore be superficial, it will be much aggravated by sticking to the woman's clothes: in this case a little cup made of wax is a good protection. The limpet shell will answer the same purpose, the edge being covered with sealing wax; or a walnut shell may do equally well. A fresh ivy leaf laid on after every suckling is very useful, the fine glaze will prevent its sticking, and as it preserves the parts from the clothes, it is very pleasant. A careless woman who does not attend to these apparent trifles will frequently have the newly formed skin torn off from her nipple, by its fastening to the coverings of the breast. No plan, however, answers so well in all sore breasts as the false teat, as any application will then heal the nipple, or as it will heal without any

Swelled Leg of lying-in Women.—This is the last disease we shall notice. It never arises before the third day, and rarely after three weeks from delivery. The disease occurs in women that have had hard labours, or easy labours; in strong constitutions, and in weak constitutions; where there is milk in abundance, and where there is none at all; whether the lochial discharge be great or little; and whether the patient be fed high or fed low. So that there seems to be nothing either in the nature or constitution of the woman which either causes or prevents it; neither would it appear to be affected by the labour, as it seems to arise alike under all circumstances. It is said to depend upon a translation of the lochial discharge, but this is very absurd.

It commonly begins with shivering, the swelling being perceived either general or partial in the leg; sometimes arising over the whole limb at once, and sometimes beginning in the ham. It seems to have some connection with the absorbent glands, as it frequently commences in the groin, from which part the swelling will continue to extend till the whole leg and thigh are as large as the body: in this way the leg will be extended to the greatest possible degree, without any redness or inflammation; but it will not bear moving; if the patient be desired to move the limb, it gives her great pain. Swellings in general will pit, but this does not; and it usually occupies one side only; and this is observed by Dr. White, who states that even the labium of one side shall be tumid, while the other is quite unaffected.

The swelling is of a peculiar character; if the hand be drawn across the limb, it does not give the uniform sensation which is commonly felt in swellings, but resembles an infinite number of irregularities difficult to be described. The best idea that can be given of it is to suppose a block, in shape resembling a leg, covered with brass nails of various sizes, and these covered with skin

stretched over it. The disease is acute, and the symptoms of fever will sometimes be considerable, and then it is by no means surprising that the secretion of milk is lessened, or the lochial discharge diminished for the reason, that the circulation is determined to other parts. In ten or twelve days the hardness of the swelling ceases, and the state of the disease is changed to a true œdema, and the limb remains weak for several months. Such a limb will always be more affected by cold than the other; after any exercise, as dancing, it will be more stiff and weak the next morning than the other. This disease sometimes attacks both sides in succession; it never occasions suppuration; Dr. White, indeed, mentions one instance of this effect, but it is doubtful from his description whether it was this sort of swelling, for œdema sometimes resembles it very closely.

It is difficult to determine the cause of this alteration of parts, or change of organization. Dr. White attempted to explain it, by supposing that an absorbent vessel gives way at its entrance into the gland, and that the lymph still passing upwards, overflows, and enters into the cavities of the cellular membrane, and their coagulating gives the unequal feel observed. This, however, is by no means a satisfactory explanation of the nature of this disease. It is difficult to know how we are to proceed in the cure of a disease with which we are so little acquainted. It is certainly useful to keep the bowels open, and to promote a gentle but continued perspiration. For this purpose antimonials and the saline draught will be efficacious; and when the pain is excessive opium should be given; if the fever be considerable, abstinence from animal food will be necessary. As to the limb itself, nothing gives more ease than laying it in a soft poultice, which will also have the good effect of keeping up a gentle perspiration. It forms the softest pillow that can be imagined, and never fails to bring relief.

Treatment of Infants.—This constitutes an extensive branch of the practice of the obstetric practitioner in modern times; especially the treatment of infants during the diseases common to the period of lactation.

It is not necessary for us, however, to enter into any detail upon this subject, important as it is in itself, having already noticed at some length both the treatment proper for infants from the moment of birth, and the diseases to which this period of life is subject, under the articles INFANCY and MEDICINE, parts III. and IV. *Nosology* and *Practice:* and to these we refer the reader.

END OF THE SEVENTH VOLUME.

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PANTOLOGIA.

P, A labial consonant, formed by a slight compression of the anterior part of the lips, and retaining an uniform sound, and the fifteenth letter in the English alphabet.

When the P is followed with an H in the same word, it has the sound of an F; thus, *phi*losophy is pronounced *f*ilosophy: and this is generally the case in words derived from the Greek.

P and B are so like each other, that Quintilian declares, that in the word *obtinuit*, his reason required him to put a *b*, but that his ears could hear nothing but a *p*, *optinuit*: hence in ancient inscriptions, and old glossaries, it appears, that these two letters have often been confounded.

Several nations still pronounce one for the other, the Welch and Germans particularly, who say, *ponum vinum*, for *bonum vinum*.

Plutarch observes, it was usual for those of Delphi to say βαλειν for παλειν, βικρον for πικρον; and among the Latins, as often as an *s* followed, the *b* was changed into as *p*, as *scribo*, *scripsi*.

P is sometimes mute before *t*, as, *accompt*; but in modern orthography it is usually omitted.

P, in the Italian music, frequently represents *piano*; which is what in our music we call soft, i. e. the force of voice or instrument is to be diminished, so as to make a kind of echo.

P P signifies *piu piano*, i. e. more soft, or a second echo weaker, or more remote than the former: and P P P signifies *pianissimo*, softest of all, or a third echo, the voice being as it were lost in the air.

P. M. among astronomers, is frequently used for *post meridiem*, or afternoon; and sometimes for *post mane*, after the morning, i. e. after midnight.

P was also used among the ancients as a numeral letter, signifying the same with the G, viz. a hundred; according to the verse of Ugutio.

P similem cum G numerum monstratur habere.

Though Baronius thinks it rather stood for seven.

When a dash was added a-top of P̄, it stood for four hundred thousand.

St. Jerome observes on Daniel, that the Hebrews had no P: but that the *ph* served them instead thereof; adding, that there is but one word in the whole Bible read with a P, viz. *apadno*.

The Greek π signified 80. The Latins used P as an abbreviature. Thus P stood for Publius, pondo. &c. In S. P. Q. R. or Senatus populusque Romanus, for populus; R. P. denoted respublica; P. C. patres conscripti; PR. S. prætoris sententia, &c. On the French coins, P denotes those that were struck at Dijon.

P, in medicinal prescription, is used for *pugil*, or the eighth part of a handful.

P. Æ. signifies *partes æquales*, equal parts of any ingredients: otherwise denoted by ā or ana.

P. P. signifies *pulvis patrum*, i. e. Jesuit's powder, or the cortex Peruvianus in powder; which is so called, because first brought into Europe by those fathers; and *p. p. t. preparatus*, prepared.

PA'BULAR. *a.* (*pabulum*, Lat.) Affording aliment or provender.

PABULA'TION. *s.* (*pabulum*, Lat.) The act of feeding, or procuring provender.

PA'BULOUS. *a.* (*pabulum*, Latin.) Alimental; affording aliment (*Brown*).

PABULUM. (from *pasco*, to feed.) Food, aliment. Whence the animal heat and animal spirits are called pabulum vitæ, the food of life.

PACA, in zoology. See MUS.

PACCHIONIAN GLANDS, in anatomy. See GLANDULÆ PACCHIONÆ.

PACE. *s.* (*pas*, French.) 1. Step; single change of the foot in walking (*Milton*). 2. Gait; manner of walk (*Sidney*). 3. Degree of celerity (*Shakspeare*). 4. Step; gradation of business (*Temple*). 5. A measure of five feet (*Holder*).

PACE is also used to signify particular motions or progressive actions of a horse. A horse has a great variety of paces, as a walk, trot, amble, canter, gallop, rating-gallop, and at speed; some of these some horses have in great perfection, which are nevertheless exceedingly deficient in others; as for instance, a horse shall be a most excellent trotter, who happens to be a shuffling, execrable walker; he shall be a gay, airy, light figure in a canter, and wonderfully different in speed. Good gallopers, again, are very frequently bad trotters.

To PACE. *v. n.* (from the noun.) 1. To move on slowly (*Spenser*). 2. To move (*Shakspeare*). 3. (Used of horses.) To move by raising the legs on the same side together.

To PACE. *v. a.* 1. To measure by steps (*Shakspeare*). 2. To direct to go (*Shakspeare*).

PA'CED. (from *pace*.) Having a particular gait (*Dryden*).

PA'CER. *s.* (from *pace*.) He that paces.

PACHAMAC, or PACHACAMA, a town of Peru, in the audience of Lima, situate in a valley of its name, formerly beautified with a magnificent temple, built by the incas, in which the Spaniards, when they conquered Peru, found immense riches. It is 15 miles S.S.E. of Lima.

PACHETE, a fort of Hindustan, in Bengal. It gives name to a circar, and stands near the Dummuda, 10 miles N.E. of Rogonatpour.

PACHUCA, a town of Mexico Proper, famous for the rich silver mines in its vicinity. It is 55 miles N. by E. of Mexico. Lon. 100. 14 W. Lat. 20. 42 N.

PACHYNUS, a promontory of Sicily, projecting about two miles into the sea, in the form of a peninsula, at the south-east corner of the island, with a small harbour of the same name.

PACI'FIC. *a.* (*pacifique*, French; *pacificus*, Latin.) Peace-making; mild; gentle; appeasing (*Hammond*).

PACIFIC OCEAN, otherwise called the SOUTH SEA, lying between Asia and America, and upwards of 10,000 miles in breadth. When Magellan entered this ocean through the dangerous strait that bears his name, he sailed three months and twenty days in a uniform direction to the N.W. without discovering land. In the distress he suffered in this voyage, before he discovered the Ladrone islands, he had the consolation of enjoying such uninterrupted fair weather, with favourable winds, that he gave this ocean the name of Pacific. The Spaniards having passed the isthmus of Darien, from N. to S. at the first discovery of this ocean, named it the South Sea; but, with respect to America, it is more properly the western ocean. On one side of the equator, it is called the North Pacific Ocean; and on the other, the South Pacific Ocean.

PACIFICA'TION. *s.* (*pacification*, Fr.) 1. The act of making peace (*South*). 2. The act of appeasing or pacifying (*Hooker*).

PACIFICA'TOR *s.* (*pacificateur*, French; from *pacify*.) Peacemaker (*Bacon*).

PACI'FICATORY. *a.* (from *pacificator*.) Tending to make peace.

PA'CIFIER. *s.* (from *pacify*.) One who pacifies.

To PA'CIFY. *v. a.* (*pacifier*, French; *pacifico*, Latin.) To appease; to still resentment; to quiet an angry person; to compose any desire (*Bacon*).

PACK. *s.* (*pack*, Dutch.) 1. A large bundle of any thing tied up for carriage (*Cleave*.). 2. A burden; a load (*L'Estrange*). 3. A due number of cards (*Addison*). 4. A number of hounds hunting together. 5. A number of people confederated in any bad design or practice (*Clarendon*). 6. Any great number, as to quantity or pressure: as, a *pack* or world of troubles.

To PACK. *v. a.* (*packen*, Dutch.) 1. To bind up for carriage (*Otway*). 2. To send in a hurry (*Shakspeare*). 3. To sort the cards so as that the game shall be iniquitously secured (*Shakspeare*). 4. To unite picked persons in some bad design (*Hudibras*).

To PACK. *v. n.* 1. To tie up goods (*Cleaveland*). 2. To go off in a hurry; to remove in haste (*Tusser*). 3. To concert bad measures: to confederate in ill (*Carew*).

PA'CKCLOTH. *s.* (*pack* and *cloth*.) A cloth in which goods are tied up.

PA'CKER. *s.* (from *pack*.) One who binds up bales for carriage (*Pope*).

PA'CKET. *s.* (*pacquet*, French.) 1. A small pack; a mail of letters (*Denham*). 2. A small bundle.

PACKET, or PACKET BOAT, a vessel appointed by the government to carry the mail of letters, packets, and expresses, from one kingdom to another by sea, in the most expeditious manner. Thus, the packet boats, under the direction of the post-master-general of Great Britain, carry the mails from Dover to Calais, from Falmouth to Lisbon, from Harwich to Helvoetsluys, and from Parkgate to Dublin. See POST.

To PA'CKET. *v. a.* (from the noun.) To bind up in parcels (*Swift*).

PA'CKHORSE. *s.* (*pack* and *horse*.) A horse of burden; a horse employed in carrying goods (*Locke*).

PA'CKSADDLE. *s.* (*pack* and *saddle*.) A saddle on which burdens are laid (*Howel*).

PA'CKTHREAD. *s.* (*pack* and *thread*.) Strong thread used in tying up parcels (*Add.*).

PA'CKWAX. *s.* The strong aponeuroses on the sides of the neck in brutes (*Ray*).

PACORUS, the eldest of the thirty sons of Orodes, king of Parthia, sent against Crassus, whose army he defeated, and whom he took prisoner. He supported the republican party of Pompey, and of the murderers of Julius Cæsar, and was killed in a battle by Ventidius Bassus, B. C. 39, on the same day (9th of June) that Crassus had been defeated.

PACOS, in zoology. See CAMELUS.

PACT. *s.* (*pact*, Fr. *pactum*, Latin.) A contract; a bargain; a covenant (*Bacon*).

PA'CTION. *s.* (*paction*, Fr. *pactio*, Lat.) A bargain; a covenant (*Hayward*).

PACTI'TIOUS. *a* (*pactio*, Lat.) Settled by covenant.

PACTOLUS, in ancient geography, a celebrated river of Lydia, rising in mount Tmolus, and falling into the Hermus, after watering the city of Sardes. It was in this river that Midas washed himself when he turned into gold whatever he touched; and from that circumstance it ever after rolled golden sand, and received the name of Chrysorrhoas. It is called Tmolus by Pliny. Strabo observes, that it had no golden sands in his age.

PACUVIUS (M.), a native of Brundusium, who distinguished himself by his skill in painting and his poetical talents. His style was rough, and without purity or elegance. He retired to Tarentum, where he died in the 90th year of his age, about 131 years before Christ.

PAD. *s.* (from paað, Saxon.) 1. The road; a footpath (*Prior*). 2. An easy paced horse (*Dryden*). 3. A robber that infests the roads on foot. 4. A low soft saddle (*Hudibras*).

To PAD. *v. a.* (from the noun.) 1. To travel gently. 2. To rob on foot. 3. To beat a way smooth and level.

PADANG, a seaport on the west coast of Sumatra, in the East Indies, in the possession of the Dutch. In 1797, it was almost totally destroyed by an earthquake, and upward of 300 lives were lost. Lon. 99. 46 E. Lat. 0. 50 S.

PA'DAR. *s.* Grouts; coarse flower (*Wott.*).

PA'DDER. *s.* (from *pad.*) A robber; a foot highwayman (*Dryden*).

To PA'DDLE. *v. n.* (*patouiller*, French.) 1. To row; to beat water, as with oars (*Gay*). 2. To play in the water (*Collier*). 3. To finger (*Shakspeare*).

PA'DDLE. *s.* (*pattal*, Welsh.) 1. An oar, particularly that which is used by a single rower in a boat. 2. Any thing broad like the end of an oar (*Deuteronomy*).

PA'DDLER. *s.* (from *paddle*). One who paddles (*Ainsworth*).

PA'DDOCK. *s.* (paða, Sax.; *padde*, Dut.) A great frog or toad (*Dryden*).

PA'DDOCK. *s.* (corrupted from *parrack*.) A small enclosure for deer, or other animals.

PADDOCK, in earlier times, signified a pasture enclosed with a wall or paling of great height, a mile in length, and a quarter of a mile broad, in which deer were coursed with greyhounds, in the same manner as hares are coursed at present, but subject to rules different from those now in use. These paddocks, from their great extent, were seldom seen but in the royal parks, or upon the demesnes of the most opulent. The sport has been a long time discontinued, and the word paddock is applied in the present time only to a small enclosure or pasture, having a pale to protect it; or to a small tract of land, surrounding, or appertaining to, a rural mansion, where a few brace of fallow deer may be kept, but not of magnitude sufficient to acquire the appellation of a park.

PADERBORN, a bishopric of Germany, in the circle of Westphalia, 32 miles long and 20 broad. In the middle of it are high mountains, and iron mines; but the rest of the country is fertile in corn and pastures. It is most remarkable for its bacon and venison.

PADERBORN, an ancient and populous town of Westphalia, capital of a bishopric. It takes its name from the rivulet Pader, which rises under the high altar of the cathedral. It has a celebrated university, and is 37 miles S.W. of Minden, and 43 E.S.E. of Munster Lon. 8. 55 E. Lat. 51. 46 N.

PA'DLOCK. *s.* (*padde*, Dutch.) A lock hung on a staple to hold on a link (*Prior*).

To PA'DLOCK. *v. a.* (from the noun.) To fasten with a padlock (*Arbuthnot*).

M. Regnier has recently invented, or rather improved, a padlock of considerable security by means of combinations, of which the following is a description.

The intention of this padlock is to secure portmanteaus, cloak bags, and other packages in the most complete manner, and to serve occasionally as defences to the key-holes of the doors of apartments.

The padlock is composed of four circular pieces of brass, on which are engraven the twenty-four letters of the alphabet. The four pieces are moveable on their axes by turning them with the finger in order to produce the combination by which it is opened.

The combination of the manufacturer is the word ROME: when this word is brought into a correct line with the two marks on the edges of the two steel plates FF, which form the external part of the padlock, those two plates can be separated a little from each other, and the clasp of the lock can be opened by the hinge.

The same process is used to fasten it, with this difference, that the two external plates are pressed together so as to confine the bow or clasp of the lock in its cell at G; after which, the combination is to be shifted so that the characters shall no longer form the same word in the before-mentioned line.

The method by which the possessor may dispose of the padlock to act by a new combination, which cannot be known to any other person:

1. A screw is taken out, which passes through the centre of the plates FF. (Plate 129, fig. 1.)

2. The combination which it is intended to

set aside, namely, that which opens the lock at present must be duly arranged.

3. The marked circular pieces or rings must be taken off from four plates of brass which constitute the central part, and together form the centre-piece of the mechanism.

4. Lastly, The rings must be replaced on the centre pieces, each according to the letter the possessor may have chosen

For example: If you would adopt the word LOCK for the combination, the letter L of the first ring must be placed over or upon a small steel tooth, which is attached to the first interior cylinder; the letter O of the second ring on the tooth of the second cylinder; the letter C of the third ring on the tooth of the third cylinder; and lastly, the letter K of the fourth tooth on the fourth cylinder.

By this means the word *lock* is set up and becomes the combination of the lock, and the word *Rome* no longer produces the disposition of parts required for the disengagement.

After this operation the screw must be replaced in the centre of the plate; this screw does not contribute to the strength of the mechanism, but is used merely to allow the exact space necessary for opening the padlock, and to prevent the separation of the rings from the central parts in the common use of the lock.

Method of using this lock as a defence to the key-hole of a door.

A ring staple A, having a wood screw, is fixed to the door above the key-hole or escutcheon of the lock.

A second ring C is fixed perpendicularly beneath the other.

A cylindrical tube of iron D, in the form of a bolt, is placed vertically in the ring of these screw staples. At the lower end of the tube is an aperture, through which the padlock is inserted, so that the tube or bolt cannot be raised or taken out.

By this contrivance the key-hole of the lock is completely defended, and the introduction of a pick-lock or false key is rendered morally impossible. For the mechanism presents 331,776 combinations, (equal to the 4th power of 24,) forming 331,775 different obstacles to prevent the removal of this defence by any person unacquainted with the secret of the proprietor.

If it be apprehended that the word of the combination may be forgotten, it will be easy to write and disguise it in many different ways, without any risk of discovery: for example:

The letter L, or eleventh letter of the alphabet, will be written	L. 11
The letter O, or fourteenth letter	14
The letter C, or third letter	3
The letter K, or tenth letter	10
Total (expressed)	L. 38

This little calculation will appear to any other person to be a common account, but it is to the proprietor a memorandum by which he will perfectly recollect that the first letter of his combination is the eleventh of the alphabet, that the second is the fourteenth, and so of the rest.

Mr. Nicholson, who published the preceding account in his Philosophical Journal, says, "I find some obscurity in Reguier's description of the manner of connecting the central piece and the external engraved part. From the operation, I apprehend, 1. that each ring has a number of notches at its inner surface, that answer to the letters on its outer face; 2. that each central round piece fits the cavity of its ring, and is prevented from turning by a tooth which it lodges in one of the notches; 3. that when all the four teeth are ranged in a line between F and F, the lock will open; and therefore, 4. when any particular letter is placed over the tooth, that letter becomes the effective letter for its own ring." See LOCK.

PADRON, a town of Spain, in Galicia, seated on the Ulla, 12 miles S. of Compostella. Lon. 8. 17 W. Lat. 42. 40 N.

PADSTOW, a seaport in Cornwall, with a market on Saturday. It has some trade to Ireland, and is seated at the mouth of the Camel, on the Bristol Channel, 30 miles W. of Launceston, and 243 W. by S. of London. Lon. 4. 45 W. Lat. 50. 42 N.

PADUA, an ancient and celebrated city of Italy, capital of the Paduano, with a university and a bishop's see. It is seven miles in circumference, and much less considerable than formerly; for great part of the circuit within the walls is unbuilt, and the town in general so thinly inhabited, that grass is seen in many places, between the stones with which the streets are paved. The houses are built on piazzas, which, when the town was in a flourishing state, may have had a magnificent appearance; but they now rather give it a more gloomy air. The Franciscan church is dedicated to St. Antonio, the great patron of the city, whose body is inclosed in a sarcophagus, under an altar in the middle of the chapel, and is said to emit a very agreeable and refreshing flavour. Pious catholics believe this to be the natural effluvia of the saint's body; while heretics assert, that the perfume proceeds from certain balsams rubbed on the marble every morning, before the votaries come to pay their devotions. The walls of this church are covered with votive offerings of ears, eyes, arms, legs, noses, and every part almost of the human body, in token of cures performed by this saint; for whatever part has been the seat of the disease, a representation of it is hung up in silver or gold, according to the gratitude or wealth of the patient. Near this church is a place, called the school of St. Antonio, where many of the actions of the saint are painted in fresco; some of them by Titian. The church of St. Justina, built from a design by Palladio (one of the most elegant he ever gave) is remarkable for its rich Mosaic pavement. The hall of the town-house is one of the largest in Europe, and contains the cenotaph of Livy, the historian, who was a native of Padua. The university, once so celebrated, is now on the decline. Here is a cloth manufacture; and it

is said that the inhabitants of Venice wear no other cloth than what is made here. The city, however, swarms with beggars, who ask charity in the name of St. Antonio. Padua was taken by the Venetians, in 1706. It is seated on the Brenta and Bachiglione, in a fine plain, 20 miles S.E. of Vicenza, and 225 N. of Rome. Lon. 12. 1 E. Lat. 45. 22 N.

PADUANO, a province of Italy, in the territory of Venice, 40 miles long and 35 broad; bounded on the E. by the Dogado, on the S. by the Polesino di Rovigo, on the W. by the Veronese, and on the N. by the Vicentino. Its soil is well watered, and is one of the most fertile in Italy. Padua is the capital.

PADULA, a town of Naples, in Principato Citeriore, 14 miles N. of Policastro. Lon. 15. 41 E. Lat. 40. 29 N.

PADUS. The wild cluster cherry, or bird's cherry. Prunus padus of Linnéus. The bark and berries of this shrub are used medicinally. The former, when taken from the tree, has a fragrant smell, and a bitter, subastringent taste, somewhat similar to that of bitter almonds. Made into a decoction, it cures intermittents, and it has been recommended in the cure of the several forms of siphylis. The latter are said to cure the dysentery.

Padus, in ancient geography, the Po.

PÆAN, among the ancient pagans, was a song of rejoicing sung in honour of Apollo, chiefly used on occasions of victory and triumph. See Apollo.

Pæan, in the ancient poetry, a foot consisting of four syllables; of which there are four kinds, the pæan primus, secundus, &c. The pæan primus consists of one long syllable and three short ones, or a trochæus and pyrrhichius, as *temporibus*; the pæan secundus consists of a short syllable, a long, and two short, or an iambus and a pyrrhichius, as *potentia*; the pæan tertius consists of two short syllables, a long and a short one, or a pyrrhichius and a trochæus, as *animatus*; the pæan quartus consists of three short syllables and a long one, or a pyrrhichius and iambus, as *celeritas*.

PÆDERIA. In botany, a genus of the class pentandria, order monogynia. Corol twisted; berry empty, brittle, two-seeded; style bifid. Two species; climbing plants of India and the Mauritius.

PÆDEROTA. In botany, a genus of the class diandria, order monogynia. Corol ringent, four-cleft, with a naked throat; calyx five-parted; capsule two-celled. Three species; natives of Italy, Austria, and Carniola.

PÆDERUS. In entomology, a Fabrician tribe of the genus Staphylinus, which see.

PÆDO-BAPTISM. (a compound of παις, παιδος, infant, and βαπτισμος, baptism.) Infant baptism, or that conferred on children.

Pædo-baptists, (formed of παις, παιδος, infant, and βαπτιζω, I baptize,) are those who maintain that baptism should be administered to infants.

PAEFENHOFFEN, a town of France, in the department of Lower Rhine, seated on the declivity of a mountain, near the river Motter, eight miles W. of Haguenau. Lon. 7. 38 E. Lat. 48. 48 N.

PÆONIA. Pæony. In botany, a genus of the class polyandria, order digynia. Calyx five-leaved; petals five; styleless; capsules many-seeded. Seven species; European plants, chiefly of Siberia. The two following are cultivated.

1. P. tenuifolia. Slender-leaved pæony. Leaves twice-ternate; leaflets many-parted, naked, with linear, subulate segments; capsules downy; germs two or three, purplish, with purple hairs. Siberia.

2. P. officinalis. Common pæony. Leaves decompound, naked; leaflets lobed, the lobes broad, lanceolate; capsules nearly erect, downy.

Of this there are two principal varieties, distinguished, but improperly, on the authority of C. Bauhin, into male and female pæony The flowers of the former are large and single, composed of five or six large, roundish, red petals. Those of the latter smaller, and of a deep purple colour. The flowers of both sorts appear in May; and are natives of Switzerland. The single sorts are easily raised by seeds, and the double by parting the roots. The seeds should be sown in autumn, soon after they are perfectly ripe. The roots of the old double-flowered plants may be taken up in the beginning of autumn, and divided so as to have one bud or eye or more to each part or crown, without which they will never form good plants.

This plant, both male and female, has been long considered as a powerful medicine; and till of late years had a place in the materia medica of the London College.

The roots and seeds of pæony have, when fresh, a faint, unpleasant smell, somewhat of the narcotic kind, and a mucilaginous, subacrid taste, with a slight degree of bitterness and adstringency. In drying, they lose their smell, and part of their taste. Extracts made from them by water are almost insipid, as well as inodorous; but extracts made by rectified spirit are manifestly bitterish, and considerably adstringent. The flowers have rather more smell than any of the other parts of the plant, and a rough sweetish taste, which they impart, together with their colour, both to water and spirit.

The roots, flowers, and seeds of pæony have been esteemed in the character of an anodyne and corroborant, but more especially the roots; which since the days of Galen have been very commonly employed as a remedy for the epilepsy. For this purpose, it was usual to cut the root into thin slices, which were to be attached to a string, and suspended about the neck as an amulet; if this failed of success, the patient was to have recourse to the internal use of this root, which Willis directs to be given in the form of powder, and in the quantity of a drachm, two or three times a day, by which, as we are informed, both infants and

adults were cured of this disease. Other authors recommended the expressed juice to be given in wine, and sweetened with sugar, as the most effectual way of administering this plant. Many writers, however, especially in modern times, from repeated trials of the paeony in epileptic cases, have found it of no use whatever; though professor Home, who gave the radix pæoniæ to two epileptics at the Edinburgh infirmary, declares that one received a temporary advantage from its use. Of the good effects of this plant in other disorders we find no instances recorded. See Nat. Hist. Pl. XCIII.

PÆONY. In botany. See PÆONIA.

PAGAN (*paganus*.) A heathen, gentile, or idolater, one who adores false gods.

Baronius derives the word *paganas a pagis*, villages, because, when Christians became masters of the cities, the heathens were obliged, by the edicts of Constantine and his sons, to go and live in the country villages, &c. Salmasius will have the word come from *pagus*, considered as originally signifying *gens*, or nation: whence, he observes, we say indifferently, pagans or gentiles.

The abbot de Fleury gives another origin of pagan: he observes, that the emperor Constantine, going from Antioch, against Maxentius, in 350, assembled all his troops, and advised such as had not received baptism to receive it immediately; declaring withal, that such as should be found unbaptized should quit the service, and go home.

Hence, perhaps, says the abbot, the name pagan might be given to those who chose the latter; the Latin word *paganus* properly signifying a person who does not bear arms, in opposition to *miles*, a soldier.

And hence it might, in time, extend to all heathens. Or, continues he, the word might come from *pagus*, village, in regard the peasants were those who adhered longest to the idolatry of the heathens.

PAGAN. *a.* Heathenish (*Shakspeare*).

PAGAN (Blaise Francis, count de), a French mathematician, born in Provence, 1604. He entered into the army, and at the siege of Montauban lost his left eye by a musket shot. At the passage of the Alps, and at the siege of Suza, he led on his soldiers to glory, and went in 1642 with the rank of field-marshal to Portugal. Here he had the misfortune to lose his eye-sight by a distemper, and with the world thus closed upon him he retired to study and meditation. The mathematics and fortification were his favourite pursuits, and he wrote a treatise on fortification; geometrical theorems; astronomical tables; theory of the planets; historical relation of the Amazon river, 8vo.; homme heroïque, &c. He died at Paris, 1665.

PAGANALIA, certain festivals observed by the ancient Romans in the month of January. They were instituted by Servius Tullius, who appointed a certain number of villages (*pagi*), in each of which an altar was to be raised for annual sacrifices to their tutelar gods; at which all the inhabitants were to assist, and give presents in money, according to their sex and age, by which means the number of country-people was known. The servants upon this occasion offered cakes to Ceres and Tellus, to obtain plentiful harvests.

PAGANELLUS, in ichthyology. See GOBIUS.

PAGANISM, the religious worship and discipline of pagans: or, the adoration of idols and false gods. See IDOLATRY, MYTHOLOGY, and POLYTHEISM.

PAGE. *s.* (*page*, French.) 1. One side of the leaf of a book (*Watts*). 2. (*page*, Fr.) A young boy attending on a great person.

To PAGE. *v. a.* (from the noun.) 1. To mark the pages of a book. 2. To attend as a page (*Shakspeare*).

PAGE OF A LEAF (Superior—inferior): (*Pagina, superior—inferior folii.*) In botany, the upper and lower surface of a leaf: the supine and prone disk, as it is sometimes expressed.

PA'GEANT. *s.* 1. A statue in a show. 2. Any show; a spectacle of entertainment (*Shakspeare*). 3. Any thing showy without stability or duration (*Pope*).

PA'GEANT. *a.* Showy; pompous; ostentatious; superficial (*Dryden*).

To PA'GEANT. *v. a.* (from the noun.) To exhibit in show; to represent (*Shakspeare*).

PA'GEANTRY. *s.* (from *pageant*.) Pomp; show (*Government of the Tongue*).

PAGET (William lord), though but the son of a serjeant at mace, was noticed by Henry VIII. and made successively clerk of the signet, of the council, and afterwards of the privy seal. He afterwards went ambassador to France, and was soon after made secretary of state. He was ambassador to Charles V. in the next reign; but his intimacy with Somerset proved injurious to his interests, and he shared his disgrace, and was fined 6000l. He died 1564.

PAGI (John Baptist), of Genoa, author of a treatise on painting, in Italian, fol. was eminent not only as a painter, but as an engraver, and died at Genoa 1629, aged 74.

PAGI (Anthony), an able critic, born at Rogna, in Provence, 1624. His great work is a critique on the annals of Baronius, a most valuable performance. He wrote besides a Latin dissertation on the consular office, and other things, and died at Aix 1699.

PAGI (Francis), nephew to the preceding, was born at Lambesc in Provence, 1654. He followed his uncle's example, and greatly assisted him by his learning in the completion of his critique on Baronius, of which he published the three last volumes. He wrote besides in Latin an history of the popes, 4 vols. 4to. He died 1721. His nephew was also a man of letters, and published a history of Cyrus the Younger, 12mo, &c.

PA'GINAL. *a.* (*pagina*, Lat.) Consisting of pages (*Brown*).

PAGLIANO, a town of Naples, in Abruzzo Ulteriore, 15 miles E.S.E. of Aquila. Lon. 13. 46 E. Lat. 42. 28 N.

PAGO, an island in the gulf of Venice, separated from Venetian Dalmatia by a narrow strait. The air is cold, and the soil barren; but it is well peopled, and contains salt works. Lon. 15. 11 E. Lat. 44. 40 N.

PAGOD, or PAGODA, a name whereby the East Indians call the temple in which they worship their gods. Before they build a pagod they consecrate the ground as follows: after having inclosed it with boards or palisadoes, when the grass is grown on the ground they turn an ash-coloured cow into it, who stays there a whole day and night; and as cow-dung is thought by the Indians to be of a very sacred nature, they search for this sacred deposit, and having found it, they dig there a deep pit, into which they put a marble pillar, rising considerably above the surface of the earth. On this pillar they place the image of the god to whom the pagod is to be consecrated. After this the pagod is built round the pit, in which the pillar is fixed. The pagod usually consists of three parts: the first is a vaulted roof supported on stone or marble columns. It is adorned with images, and, being open, all persons without distinction are allowed to enter it: the second part is filled with grotesque and monstrous figures, and nobody is allowed to enter it but the bramins themselves: the third is a kind of chancel, in which the statue of the deity is placed: it is shut up with a very strong gate.

The word is sometimes used for the idol, as well as for the temple.

PAGOD is also the name of a gold coin, current in several parts of the Indies, on the footing of the piece of eight. The English coin pagods at Fort St. George, and the Dutch at Palicate.

There are also silver pagods struck at Narsingua, Bisnagar, &c. which usually bear the figure of some monstrous idol: whence their names. They are of various values.

PAGURUS. In the entomological system of Fabricius, a tribe of the genus CANCER, which see.

PAID. The pret. and part. passive of *pay*.

PAI'GLE. *s.* A flower, also called cowslip.

PAIL. *s.* (*paila*, Spanish.) A wooden vessel in which milk or water is commonly carried.

PAI'LFUL. *s.* (*pail* and *full*.) The quantity that a pail will hold (*Shakspeare*).

PAILMA'IL. *a.* Violent; boisterous (*Digby*).

PAIN. *s.* (*peine*, French.) 1. Punishment denounced (*Sidney*). 2. Penalty; punishment (*Bacon*). 3. Sensation of uneasiness (*Bacon*). 4. (In the plural.) Labour; work; toil. 5. Labour; task (*Spenser*) 6. Uneasiness of mind; anxiety (*Prior*). 7. The throws of childbirth (*Samuel*).

To PAIN. *v. a.* (from the noun.) 1. To afflict; to torment; to make uneasy (*Jeremiah*). 2. To labour (*Spenser*).

PAINBOEUF, a seaport of France, in the department of Lower Loire, at the mouth of the Loire. Hence all the ships belonging to Nantes take their departure, and here they anchor on their arrival. It is 20 miles W. of Nantes. Lon. 1. 53 W. Lat. 47. 15 N.

PA'INFUL. *a.* (*pain* and *full*.) 1. Full of pain; miserable; beset with affliction (*Mil.*). 2. Giving pain; afflictive (*Addison*). 3. Difficult; requiring labour (*Shakspeare*). 4. Industrious; laborious (*Dryden*).

PA'INFULLY. *ad.* (from *painful*.) 1. With great pain or affliction. 2. Laboriously; diligently (*Raleigh*).

PA'INFULNESS. *s.* (from *painful*.) 1. Affliction; sorrow; grief (*South*). 2. Industry; laboriousness (*Hooker*).

PAI'NIM. *s.* (*payen*, French.) Pagan; infidel (*Peacham*).

PAI'NIM. *a.* Pagan; infidel (*Milton*).

PAI'NLESS. *a.* (from *pain*.) Free from pain; void of trouble (*Dryden*).

PAINSTA'KER. *s.* (*pains* and *take*.) Labourer; laborious person (*Gay*).

PAINSTA'KING. *a.* (*pains* and *take*.) Laborious; industrious.

PAINSWICK, a town in Gloucestershire, with a market on Tuesday. It has a manufacture of white cloths for the army, and for the India and Turkey trade; and hence is brought a stone, remarkable for its beauty and neatness, for the pavement of floors. Painswick is situate so high, as every way to command extensive views over a vale of vast richness and variety, of the windings of the Severn, Malvern Hills, and parts of the counties of Salop, Hereford, and Monmouth. It is seven miles S.E. of Gloucester, and 101 W. by N. of London, Lon. 2. 11 W. Lat. 52. 46 N.

To PAINT. *v. a.* (*peindre*, French.) 1. To represent by delineation and colours. 2. To cover with colours representative of something (*Shakspeare*). 3. To represent by colours, appearances, or images (*Locke*). 4. To describe; to represent (*Shakspeare*). 5. To colour; to diversify (*Spenser*). 6. To deck with artificial colours (*Shakspeare*).

To PAINT. *v. n.* To lay colours on the face (*Pope*).

PAINT. *s.* (from the verb.) 1. Colours representative of any thing. 2. Colours laid on the face (*Anon.*).

PAINT, a term used to express more particularly the preparations employed in painting houses.

The principal article in the various compounds being white lead, the grinding of which is extremely detrimental to health, we shall state the following process, lately invented by M. A. A. De Vaux, and communicated for the benefit of the public: should it prove to be an effectual substitute for the pernicious paint now employed, it will be of inestimable service to society. He directs two Paris pints of sweet skimmed milk (two quarts English measure); six ounces (6¼ ounces English averdupois) of fresh slaked lime; four ounces of nut, caraway, or linseed oil, and three

pounds of Spanish white, to be used in the composition. The lime must first be introduced into a stone vessel; to which should be added such a proportion of milk as will produce a mixture resembling thin cream. Next, the oil is to be gradually poured in; the whole being gently stirred, and the remainder of the milk added. The Spanish white must next be crumbled in, or scattered on the surface of the fluid, which it gradually imbibes, and at length sinks; when the whole should be briskly agitated.

M. De Vaux observes, that the milk ought not to be sour; because, in such case, it would form with the lime a calcareous acetite, which strongly attracts moisture. Either of the oils above-mentioned may be used; but, if white paint be required, that of caraways is preferable; as it is perfectly transparent.—In order to obtain a distemper or size-colour, the paint thus prepared may be tinged with levigated charcoal, yellow ochre, &c. for painting with which, the most common oils may be used.

The quantity here prescribed is, farther, stated to be sufficient for the first coat of six toises, or from twenty-four to twenty-seven square English yards: it may be applied in the usual manner; and costs in Paris the sum of nine sols, or 4½d. sterling.

PAINTED LADY. In botany. See DIANTHUS.

PAINTED LADY PEA. See LATHYRUS.

PAINTER. *s.* (*peintre*, French.) One who professes the art of representing objects by colours (*Dryden*).

PAINTING, is the art of representing all objects of nature visibly, by lines and colours on a plain surface. It has also the power of expressing by the same means conceptions and images of the mind which do not actually exist in any of the usual forms of nature. It is to be considered as an art displaying either conjointly or separately the powers of imagination and imitation: and may be divided into invention, which regards the original thought or conception of the subject; and into composition, design, and colouring, which regard the execution of the work.

Invention consists generally in the choice of such subjects as are best calculated to answer some great and interesting end; and particularly in discovering or selecting such subjects as are capable of being most appropriately expressed by painting, and of producing a powerful effect by such means as are distinctively placed within the compass of that art.

Composition regards the arrangement of the subject both as to forms, and to the general effects of light and shade, and of colour. It comprehends the general distribution and grouping of the figures, their combination or contrast, the choice of attitudes, the disposal of draperies, the situation of the scene itself, as well as the distribution and connection of all the various parts of scenery and ornament.

The important objects which design embraces will be found fully explained under that article. See DESIGN.

Colouring regards, first, the infinite variety of hues with which nature distinguishes her forms, agreeably to the degree and mixture of the rays of light which their surfaces reflect: and, secondly, the distribution, apposition, and accompaniment, of various hues or tints, so as to produce the effect most pleasing to the sight, a circumstance in which nature always delights.—It embraces also the light and shade of objects, as far as by the diminution or increase of these the harmony of tints before-mentioned can be effected; but that mixed effect of colour and of light and shade which is denominated chiaro-scuro, is more justly regarded as a branch of composition.

As all the objects of nature are susceptible of imitation by the pencil, the masters of this art have applied themselves to different subjects, each one as his talents, his taste, or inclination, may have led him. From whence have arisen the following classes.

I. *History-painting:* which represents the principal events in history sacred and profane, real or fabulous; and to this class belongs allegorical expression. These are the most sublime productions of the art; and in which Raphael, Guido, Rubens, Le Brun, &c. have excelled.

II. *Rural history*; or the representation of a country life, of villages and hamlets, and their inhabitants. This is an inferior class; and in which Teniers, Breughel, Watteau Morand, &c. have great reputation, by rendering it at once pleasing and graceful.

III. *Portrait-painting*; which is an admirable branch of this art, and has engaged the attention of the greatest masters in all ages, as Apelles, Guido, Vandyke, Rembrandt, Regauds, Pesne, Kneller, La Tour, &c.

IV. *Grotesque histories*; as the nocturnal meetings of witches; sorceries and incantations; the operations of mountebanks, &c.; a sort of painting in which the younger Breughel, Teniers, and others, have exercised their talents with success.

V. *Battle-pieces*; by which Hichtemberg, Wouwerman, &c. have rendered themselves famous.

VI. *Landscapes*; a charming species of painting, that has been treated by masters of the greatest genius in every nation.

VII. *Landscapes diversified with waters*, as rivers, lakes, cataracts, &c.; which require a peculiar talent, to express the water sometimes smooth and transparent, and at others foaming and rushing furiously along.

VIII. *Sea-pieces*; in which are represented the ocean, harbours, and great rivers; and the vessels, boats, barges, &c. with which they are covered; sometimes in a calm, sometimes with a fresh breeze, and at others in a storm. In this class Backhuysen, Vandervelde, Blome, and many others, have acquired great reputation.

IX. *Night-pieces*; which represent all sorts of objects, either as illuminated by torches, by the flames of a conflagration, or by the light of the moon. Schalck, Vanderneer, Vanderpool, &c. have here excelled.

X. *Living animals*: a more difficult branch of painting than is commonly imagined; and in which Rosa, Carré, Vandervelde, and many others, have succeeded marvellously well.

XI. *Birds of all kinds*; a very laborious species, and which requires extreme patience minutely to express the infinite variety and delicacy of their plumage.

XII. *Culinary-pieces*; which represent all sorts of provisions and animals without life, &c. A

species much inferior to the rest, in which nature never appears to advantage, and which requires only a servile imitation of objects that are but little pleasing. The painting of fishes is naturally referred to this class.

XIII. *Fruit-pieces*, of every kind, imitated from nature.

XIV. *Flower-pieces*; a charming class of painting, where art in the hands of Huyzum, P. Segerts, Merian, &c. becomes the rival of nature. Plants and insects are usually referred to the painters of flowers, who with them ornament their works.

XV. *Pieces of architecture*; a kind of painting in which the Italians excel all others. Under this class may be comprehended the representations of ruins, sea-ports, streets, and public places: such as are seen in the works of Caneletti, and other able masters.

XVI. *Instruments of music, pieces of furniture*, and other inanimate objects; a trifling species, and in which able painters only accidentally employ their talents.

XVII. *Imitations of bas reliefs*; a very pleasing kind of painting, and which may be carried by an able hand to a high degree of excellence.

XVIII. *Hunting pieces*; these also require a peculiar talent, as they unite the painting of men, horses, dogs and game, to that of landscapes.

We shall not here attempt to prescribe rules for the art of painting. Good masters, academies of reputation, and a rational practice, are the only true sources from whence the young painter must derive the detail of his art; and for this reason we shall avoid enlarging on that part of painting of which words are incompetent to convey an idea. It will be more interesting to the general reader, if we here give a brief history of the rise and progress of painting, and of the different schools, in ancient and modern times.

It is to be imagined that men must naturally, and very early, have conceived an idea of the first principles of the art of painting, the shadow of each plant and animal, and of every object in nature, must have afforded them the means of conceiving, and pointed out the possibility of imitating, the figures of all bodies. Thus the savage nations, an emblem of what men were in the infancy of society, possess the first rudiments of this art, even before those which are useful and almost necessary to existence; their naked bodies are covered with punctures of various forms, into which they infuse indelible colours. The next demand for this art is to preserve the memory of warlike exploits. It is more natural to form some representation of an action, than to give an account of it by means of arbitrary characters. Hence the picture-writing of the Mexicans, and the more artful hieroglyphics of Egypt.

Painting consisted of simple outlines long before the expression of relievo or the application of colour. It was simply drawing; and the masterpieces of painting in that rude period were not superior to the sports of children. Although occupied about a single point, it was not brought to perfection: for constant experience instructs us that men never excel in the inferior parts of an art till they are capable of carrying the whole to perfection.

After employing for a long time those simple outlines, the next step in the art of painting was to make the imitation more complete, by applying colours: this was first accomplished by covering the different parts of the figure with different colours in the same way that we colour maps; and several nations, as the Egyptians, the Chinese, and the different nations of India, have never painted in a better manner. Other nations, more ingenious and more attentive to the arts, observing that the objects of nature have relievo, have invented what is called claro-obscuro. The Greeks, the most ingenious, penetrating, and delicate of all, invented this part antecedent to colours; than which there cannot be a greater proof of their exquisite taste, as the glare of colours without judgment excites more admiration in the minds of the vulgar and ignorant, than the camaieu or drawings of one colour executed by the most skilful artist.

These general observations concerning the gradual improvement of this art will be best illustrated by a more particular attention to the ancient nations in which it flourished.

Plato, who lived 400 years before the Christian era, informs us that painting had been practised in Egypt for ten thousand years; that some of the productions of that high antiquity were in existence; and that they bore an exact resemblance to those which the Egyptians executed in his time. Without regarding the period of ten thousand years mentioned by Plato, it is reasonable to consider it as an indeterminate period, which carries us back to very remote antiquity.

The figures either in the painting or sculpture of Egypt were extremely stiff; the legs were drawn together, and their arms were pasted to their sides. It appears that their only model was their mummies, and that their skill in anatomy was derived from embalming them. They were extremely incorrect in every part of the head; they placed the ears much higher than the nose. Besides, they gave the face the form of a circle instead of an oval; the chin was short and rounded; the cheeks excessively so; and they turned upwards the corners of the mouth and eyes. Many of these faults may be ascribed to the formation of the human face in Egypt, but the placing of the ears could only be founded in caprice or ignorance.

The exactness of the Egyptian proportion is much celebrated; but although we grant that they observed the proper length of the different parts of the human body, they were still defective artists, since they did not observe the breadth, and were moreover ignorant altogether of the shape and size of the muscles. Works converted to religious purposes chiefly occupied the Egyptian painters. They had figures for imitation from which they would not depart, and those figures were monstrous; the bodies of animals with the heads of men; the bodies of men with the heads of animals: or, if the figure was more agreeable to nature in its parts, yet it was so deformed and imaginary, as to have nothing similar to it as a whole in the creation of God.

The monuments of Egyptian painting with which we are best acquainted (says Winklemann) are the chests of mummies. These works have resisted the injuries of time, and are still submitted to the examination of the curious. The white, made of white lead, is spread over the ground of the piece; the outlines of the figure are traced with black strokes, and the colours are four in number; namely, blue, red, yellow, and green, laid on without any mixture or shading. The red and blue prevail most; and those colours

seem to have been prepared in the coarsest manner. The light is formed by leaving those parts of the ground where it is necessary, covered with the white lead, as it is formed by the white paper in some of our drawings. This description is sufficient to convince us that the whole art of painting in Egypt consisted in colouring; but every person knows, that without tints and the mixture of colours, painting can never arrive at great perfection.

In Upper Egypt there seems to have existed a kind of colossian painting, which has never been examined except by travellers who were no great critics in the art. Winklemann had some reason to express a desire that those remains of antiquity, with regard to the manner of working, the style, and the character, had been accurately explored. Walls of 24 feet in height, and pillars of 32 feet in circumference, are wholly covered with those colossian figures. According to Norden they are coloured in the same manner with the mummies: the colours are applied to a ground prepared in manner of fresco; and they have retained their freshness for many thousand years. Winklemann adds, that all the efforts of human skill and industry could make as little impression on them as the injuries of time. His enthusiasm for antiquity has perhaps led him into this extravagant exaggeration.

It appears that the great employment of the Egyptian painters was on earthen vessels, on drinking cups, in ornamenting barges, and in covering with figures the chests of mummies. They painted also on cloth; but painting, as an industrious occupation, supposes a workman, not an artist: the decoration of temples, house-painting, and that of the figures relative to religion, are to be considered only in this point of view. The workmen in Russia who paint our Saviour holding the globe in one hand, and blessing the people with the other, are not members of the imperial academy of fine arts.

Pliny informs us that the Egyptian artists painted also the precious metals; that is to say, they varnished or enamelled them. It is doubtful what this art was, but most probably it consisted in covering gold or silver with a single colour.

The Egyptians are supposed to have continued this coarse style till the reign of the Ptolemies.

The Persians were so far from excelling in the arts, that the paintings of Egypt were highly esteemed among them after they had conquered that country.

The carpets of Persia were of great value in Greece, even in the time of Alexander the Great, and these were adorned with various figures; but this is no proof that they were well executed, any more than a demand for several of the Chinese productions is at present a proof of the taste of that people in the arts. It was the fabrication of the silk, and not the truth of the representation, which made the Greeks admire the carpets of Persia.

The Persians, as well as the Arabians, had some knowledge of Mosaic work. This is only valuable when it copies, in a manner that cannot be destroyed, the works of a great master; but if the Persians had no good pictures to copy into Mosaic, it was of no consequence to be able to arrange, in a solid manner, pieces of flint one beside another.

There is only one Persian painter whose name has descended to posterity; and he is preserved, not because he was a painter, but because he accommodated the ancient doctrine of the two principles to the Christian religion. Besides, it is doubted whether Manes was a Persian or a Greek, and it is still less known whether he was a painter. He is praised in Asia for drawing straight lines without a ruler.

The modern Persians have made no kind of progress in the arts. The emperor Schah-abbas, wishing from caprice to be instructed in drawing, was obliged to have recourse to a Dutch painter who happened to be in his dominions.

The modern Persians paint on cloth, and the artists in India are their rivals in this branch of industry; but their paintings are purely capricious. They represent plants and flowers which have no existence in nature; and their only merit consists in the brightness and the strength of their colours.

Besides this, the art in India, as it was in the most remote antiquity, is confined to monstrous figures connected with their religion, animals not to be found in the world, and idols with a multitude of arms and heads, which have neither exactness in their forms nor proportions. See POLYTHEISM.

The paintings of Thibet discover great patience in the artist, and are remarkable for the fineness of their strokes. Their painters might dispute with Apelles and Protogenes for extreme tenuity of pencil; but it is in this alone, without any regard to the art, in which their merit consists.

Some of the idols in Thibet are executed in a certain style of relievo; but those productions are not only imperfect, they are also so destitute of beauty as to forbid every hope of excellence in the art. The same thing may be observed with regard to many of the eastern nations; they seem to have that want of style which would for ever condemn them to mediocrity, even if they should happen to arrive at it.

An obscure Italian painter, named Giovani Ghirardini, who travelled into China, whose judgment is more to be depended on in an art which he practised than that of other travellers, declares that the Chinese have not the least idea of the fine arts; and this opinion is confirmed by every thing which we know of that people.

The Chinese seem not to have the smallest conception of perspective. Their landscapes have no plan, no variety in the appearance of the clouds, and no diminishing of the objects in proportion to their distance.

The great object of their painting seems to consist in making their figures as unlike nature as possible: it is a serious caricature of the human figure.

To make the art flourish, it is necessary that the artist be esteemed and rewarded. In China, there is no artist so poorly paid as the painter.

The ignorant admire the brightness and purity of their colours; but simple colours appear always bright and pure: the difficulty of the art consists in melting them into one another in such a manner that the mixture shall not be perceived. It must at the same time be confessed, that their natural colours are more brilliant than ours; but if there be any merit in this, it is to be ascribed to their climate, not to their ability.

A Jesuit missionary, who in his youth had been a grinder of colours, was raised to the greatest eminence as a painter in the imperial court of China, and Raphael himself was never so much respected. The Chinese battles sent from that

country to Paris to be engraved, are the works of the Jesuits; and except they were done by the Chinese themselves, it is impossible to conceive that they could be worse executed.

The Chinese, like other eastern nations, have a few simple strokes which they repeat in all their variety of figures. In the figures on the earthenware, they discover no knowledge of forms, no expression of the most conspicuous muscles, and no idea of proportion. And in all the paintings of China, anatomy seems to bear no relation to the art. Some heads done by a Chinese painter have a sort of resemblance to nature, but they are in a low and vicious taste: the fulness of the drapery conceals the parts in such a manner that they do not seem to exist under it. Sculpture in China is in a state of no great perfection, but at the same time it is better executed than their paintings.

The ancient inhabitants of Etruria, now called Tuscany, were the first who connected the arts with the study of nature. In some of their monuments which still remain there is to be observed a first style, which shows the art in its infancy; and a second, which, like the works of the Florentine artists, shows more of greatness and exaggeration in the character than precision or beauty.

Pliny says that painting was carried to great perfection in Italy before the foundation of Rome; perhaps he means in comparison with the infancy of the art in Greece at that period; but it appears that even in his time the painters of Etruria were held in great reputation.

The only Etrurian paintings which remain have been found in the tombs of the Tarquins. They consist of long painted frizes, and pilasters adorned with huge figures, which occupied the whole space from the base to the cornice. These paintings are executed on a ground of thick mortar, and many of them are in a state of high preservation.

Winklemann is of opinion that the Greek colonies established at Naples and Nola had at a very early period cultivated the imitative arts, and taught them to the Campanians established in the middle of the country. This learned antiquarian considers as work purely Campanian, certain medals of Capua and Teanum, cities of Campania into which the Greek colonies never penetrated. The head of a young Hercules, and the head of a Jupiter, according to Winklemann, are executed in the finest manner. It is still a question, however, in the learned world, whether these medals owe their existence to Carthage or to Campania.

"But there have been discovered (adds Winklemann) a great number of Campanian vases covered with painting. The design of the greatest part of these vases (says he) is such, that the figures might occupy a distinguished place in a work of Raphael. Those vases, when we consider that this kind of work admits of no correction, and that the stroke which forms the outline must remain as it is originally traced, are wonderful proofs of the perfection of the art among the ancients." Winklemann had an opportunity of examining a very fine Campanian vase, on which was painted a burlesque representation of the loves of Jupiter and Alcmene. But as this must have been derived from some fragment of a Grecian comedy, the count de Caylus is persuaded that the Campanian vases are of Greek origin.

Although the history of Greek painting be more fully known than that of the same art among the barbarous nations, it is nevertheless involved in much obscurity. Pliny is almost the only author who has preserved the materials of its history; and he complains, that on this occasion the Greek writers have not discovered their usual exactness. They place, says he, the first painter of whom they speak in the 90th Olympiad, 420 years before the Christian era. It is certain that painting in dry colours existed at the time of the siege of Troy, or at least when Homer wrote the account of it. The buckler of Achilles is a sufficient proof that the Greeks were then acquainted with the basso-relievo, a kind of sculpture which bears a near affinity to painting.

In the Iliad, Helen is represented as working at a tapestry, whereon she figured the numerous combats of which she was the cause. When Andromache was informed of her husband's death, she was occupied in representing on tapestry flowers of various colours. From these facts, it is certain that painting was not confined to simple strokes, nor even to the camaieu; and hence it is reasonable to conclude, that what is called linear painting was practised long before the time of Homer. Polygnote of Thasos, who lived about 420 years before the Christian era, was the first painter of any eminence in Greece. Pliny informs us that he was the first who clothed his female figures, who varied the colours of the different parts of their dress, or who opened their mouths in such a manner as to show their teeth. Aristotle, who flourished in a subsequent period, allows this painter to have excelled in expression. But the art of painting may be still considered in its infancy in Greece, till about 400 years before the Christian era, when Zeuxis and Parrhasius flourished. In the contest between these eminent painters, Zeuxis declared himself to be overcome, because in a cluster of grapes which he painted he had deceived the birds; whereas Parrhasius in a curtain which he executed deceived his rival. The principal works of Zeuxis are his Penelope, in which, according to Pliny, he appears to have expressed the manners of that princess; a Jupiter surrounded by the gods; a Hercules strangling the serpents in the presence of Amphitrion and Alcmene; an Helen and a Marsyas bound. From this enumeration of these works, and from the fame which they have acquired, it is evident that the difficult parts of the art, and those which in the execution render it estimable, were now begun to be studied. By Apelles, Protogenes, and Euphranor, it was carried to the greatest height of perfection. Grace, and symmetry, and proportion, and illusion, were now added by the greatest masters to the noblest objects of nature.

We have already seen, that before the foundation of Rome the arts were cultivated in Etruria. They were also early introduced into Latium; but whether that country employed its own artists or those of Etruria, remains altogether uncertain. One need not be astonished, that at a period when the arts were in their infancy in Greece, they were raising statues to their kings in Rome: but at that period all their artists were Etrurians or Latins; and when they conquered Italy, they made all the nations of it as barbarous as they were themselves.

In the year 259 from the building of the city of Rome, and 494 years before the Christian era, Appius Claudius consecrated a number of shields in the temple of Bellona, which contained in basso-relievo the portraits of his family. This example was followed; and in process of time it was common among the Romans to place those images in

from mummies and from the works of Pliny, that their colours were not prepared and mixed with that varnish, and as it is plain rather that this varnish was externally laid over the finished pictures; no other conclusion can be drawn, except that they were within sight of the discovery, and that it is a matter of wonder that they should not have laid hold of it.

The outlines of the old Greek or Etruscan vases are merely fallacious appearances.

The old Greek and Roman paintings on walls and stones are either painted in distemper and fresco, or they have not been sufficiently examined.

The oil used in the coarser wax and wall paintings, proves at most that experiments had been tried with oils; but we have no direct proofs of oil painting having been understood or used by the Egyptians, Greeks, or Romans; and that, however great their skill or ingenuity, they might very well have been within sight and reach of the discovery, and nevertheless have missed it.

The art of painting was revived in Europe about the end of the 13th or beginning of the 14th century. The human mind, however, plunged in profound ignorance, was destitute of every principle of sound philosophy which might enable it to determine on the objects of the arts; and of consequence the painters contented themselves with works adapted to the general taste, without beauty and without proportion. In Italy, where the first attempts were made, they were employed in representing the mysteries of the passion, and subjects of a similar nature, on the walls of chapels and churches. Their labours were directed to a vast number of figures, rather than to the beauty and perfection of each; and the art in more modern times has always preserved somewhat of this absurd fault which it contracted at that early period. The artist in our times is not, like those in Greece, at liberty to devote his talents only to men of knowledge and discernment; he is constrained to please those who are rich, and very frequently those who are ignorant. Instead of proposing to himself the perfection of the art as the great object of his pursuit, he must rest his success and character on the facility of his operation and the abundance of his works.

Painting did not long continue in the imperfect condition in which it was left by those who first cultivated it among the moderns. It was natural that their successors should endeavour to surpass them by joining some degree of theory to the barbarous practice they had adopted. The first thing which they discovered, or rather which they revived after the manner of the ancients, was perspective. This made the artists capable of expressing what is called foreshortening, and of giving more affect and more truth to their works.

Dominique Ghirlandaios, a Florentine, was the first who enriched the style of his composition by grouping his figures, and who gave depth to his pictures, by distinguishing, by exact gradations, the spaces which his figures occupied; but his successors have far surpassed him in boldness of composition.

Leonard da Vinci, Michael Angelo, Giorgion, Titian, Bartholemew de St. Marc, and Raphael, flourished about the end of the 14th century. Leonard da Vinci was the inventor of a great many details in the art: Michael Angelo, by studying the ancients, and by his knowledge of anatomy, arrived at great elegance in drawing the outlines of his figures: Giorgion enriched the art in general, and gave greater brilliancy to his colours than his predecessors: Titian, by a careful imitation of nature, made great proficiency in the truth and perfection of his tones: Bartholemew de St. Marc studied particularly the part of drapery, and discovered the claro-obscuro, the best manner of giving drapery to his figures, and of making the naked to be felt even where they were covered: Raphael, endowed with a superior genius, began with studying carefully all his predecessors and all his contemporaries. He united in himself all the excellencies which they possessed; and formed a style more perfect and more universal than any painter who went before or who has succeeded him. But while he excelled in every part of the art, he was chiefly superior in those of invention and of composition. It is probable that the Greeks themselves would have been filled with admiration if they had beheld his chief pieces in the Vatican, where to the greatest abundance of paintings is joined so much perfection, and purity, and ease.

After painting had arrived at the greatest perfection among the Greeks by the exertions of Zeuxis and Parrhasius, Apelles found nothing to add to the art except grace, in the same manner among the moderns, after Raphael had appeared, grace was the only thing wanting to the art, and Correggio became the Apelles of Europe. Painting was by him carried to the highest degree among the moderns; the taste of the best critics and the eye of the vulgar were equally gratified.

After these great masters a considerable interval elapsed till the time of the Caracci. Those artists, born at Bologna, by studying the works of their predecessors with great care, and particularly those of Corregio, became the first and the most celebrated of their imitators. Hannibal possessed a very correct design, and united somewhat of the ancient style to that of Lewis his brother; but he neglected to inquire into the intricate principles and philosophy of the art. The pupils of the Caracci formed a school after their manner; but Guido, a painter of an easy and happy talent, formed a style altogether graceful, and rich, and easy. Guersheem formed after Caravaggio, or invented himself a particular style of the claro-obscuro, composed of strong shades and vivid oppositions.

Peter de Cortona succeeded those great imitators of their predecessors and of nature; who finding it difficult to succeed in that kind of painting, and having besides great natural abilities, applied himself chiefly to composition or arrangement, and to what the artists call taste. He distinguished invention from composition; appeared not to have attended to the former, but chiefly to those parts which are most prominent in the picture, and to the contrasting of groups. It was then that the practice was introduced of loading pictures with a great number of figures, without examining whether or not they agreed to the subject of the history. The ancient Greeks employed a very small number of figures in their works, in order to make the perfection of those which they admitted more evident. The disciples or imitators of Cortona, on the other hand, have sought to conceal their imperfections by multiplying their figures. This school of Cortona is divided into many branches, and has changed the character of the art. The multiplication of figures, without a judicious and proper choice, carried back the art of painting to that point where the first restorers of it among the moderns had left it; while at the same time the

disciples of Cortona were enabled to give to this first condition of the art a greater degree of perfection than the first artists.

About the middle of the 17th century flourished at Rome Carlo Maratti, who, aiming at the greatest perfection, carefully studied the works of the first painters, and particularly those of the school of the Caracci. Although he had already studied nature, he discovered by the works of these artists that it is not always proper to imitate her with a scrupulous exactness. This principle, which he extended to every part of the art, gave to his school a certain style of carefulness, which however is considerably degenerated.

France has also produced great masters, particularly in the part of composition; in which Poussin, after Raphael, is the best imitator of the style of the ancient Greeks. Charles le Brun and many others distinguished themselves for great fertility of genius; and as long as the French school departed not from the principles of the Italian school, it produced masters of great merit in the different branches of the art.

Mengs, from whom this account is taken, is not deceived when he declares the art of painting to have degenerated in France after Le Brun; but he seems to be mistaken in giving the imitation of the works of Rubens found at Paris as the cause of this decay. It appears from this opinion, that the recent French school was not well known to him. The French, indeed, if we may believe their own authors, were ne[illegible]h occupied in the imitation of Ruber[illegible]y have for a long time despised him [illegible] perfection of the dramatic art in France, [illegible]e litess of their actors, the magnificence and manners of the court, have contributed very much to the decay of painting. Instead of forming their taste on the beautiful simplicity of nature, their painters studied the gestures and the attitudes of comedians, the fopperies of women of fashion, the affected airs of courtiers, the pageantry of Versailles, and the magnificence of the opera. Mengs says, "that the French have formed a national style, of which ingenuity and what they call *esprit* are the discriminating qualities; that they have ceased to introduce Greek, Egyptian, Roman, or barbarian personages into their paintings; and that, after the example of Poussin, they content themselves with figures altogether French, as if it were their intention to hand down to posterity that such a nation once existed."

Since, according to the confession of Mengs, their figures are altogether French, there is no reason to believe that the French painters have imitated Rubens. whose works are marked much more strongly than those of his master Æneus with the Flemish character. The truth is, that their painters, like Cortona and Maratti, have crowded their pictures with a great number of figures; have grouped them in a manner most calculated to strike the senses; have been more intent on agreeable artifices than expression and beauty; and, finally, that they have borrowed the manners of the court and theatre.

The first masters of the great schools of painting, with the ancients and nature for their guides, and their genius for their support, carried every part of the art to the greatest height of perfection. Those who followed them, and who had the example of their predecessors in addition to the first sources of truth and beauty, did by no means arrive at the same excellence. The Caraccis in their school, Paul Veronese, and all the painters of his time, Vandyke, and all those who exercised the art in Italy, in Flanders, and in France, supported it with great brilliancy. But soon after the number of artists was multiplied; and slavishly copying men of inferior talents, they produced works of an inferior nature. Some wanting to be colourists, their pieces were exaggerated; others affecting simplicity, became cold and insipid. At this period of the art, men of real abilities, and covetous of fame, who wished to rise superior to the mediocrity of the times, seem not to have taken the road of truth and nature. They affected a style of pompous preparation, and annexed a kind of merit to the expert management of the pencil. The affected forms of Cortona and of his pupils, the fantastical attitudes and the poignant effects of Piazetta, and in short the ingenious contrivances of the last masters of the French school, are decided proofs of this increasing bad taste.

It appears, that for some time past greater pains have been taken to fiom men for the art than to encourage those who possess the talent. In consequence of this ruinous practice, schools for drawing, very different from those formed by able painters, have been exceedingly multiplied; and these give the elements according to an uniform system, by which the mind is laid under a regular restraint at the very threshold of the profession. This evil is productive of two inconveniences; it gives middling painters, and it multiplies them to that degree, as to hasten the downfall and bring into contempt the art itself.

The particular reputation of the Italian painters furnishes another reason for the decline of the art. The first painters of that country were few in number; they were honoured, and they deserved to be honoured. Their distinguished reputation has conferred a value on the general paintings of their countrymen. The desire of possessing taste, or of being thought to possess it, has led the rich and the ignorant of all nations to give a preference to the Italian market. Necessity, in this case, would multiply the painters; and their abilities must bear a pretty exact proportion to the discrimination of those who give the price.

The decline of painting has also arisen from the despotism which for some time reigned in the academic societies. In fact, these have often been ruled by men who would force every exertion of genius into their peculiar tract of operation. If they required such or such merit of execution, the first principles of the art were neglected for that peculiar excellency. In this manner the schools were absolute in behalf of design as long as statuary was held in chief estimation. The artist, whose abilities and inclination led him to colouring, was obliged to abandon a pursuit which could be of no service to him, and devote himself to that for which he was not qualified by nature. On the other hand, if the instructions of the schools be confined to colouring, a mind disposed to the choice and exactness of forms will find no encouragement, and be for ever lost to the art. In this manner the ignorance of those who wish to be connoisseurs, and the narrow views of those who pretend to direct the general taste, have equally contributed to the decline of the arts.

Sect. II. *Of the Schools.*

A school, in the fine arts, denominates a class of artists who have learned their art from a certain master, either by receiving his instructions, or by studying his works; and who of consequence dis-

cover more or less of his manner, from the desire of imitation, or from the habit of adopting his principles.

All the painters which Europe has produced since the renovation of the arts are classed under the following schools: the school of Florence, the school of Rome, the school of Venice, the Lombard school, the French school, the German school, the Flemish school, the Dutch school, and the English school.

The Florence school is remarkable for greatness; for attitudes seemingly in motion; for dark severity; for an expression of strength, by which grace perhaps is excluded; and for a character of design approaching to the gigantic. The productions of this school may be considered as overcharged; but it cannot be denied that they possess an ideal majesty, which elevates human nature above mortality. The Tuscan artists, satisfied with commanding the admiration, seem to have considered the art of pleasing beneath their notice.

This school has an indisputable title to the veneration of all the lovers of the arts, as the first in Italy which cultivated them.

Painting, which had languished from the destruction of the Roman empire, was revived by Cimabue, born of a noble family in Florence in the year 1240. This painter translated the poor remains of the art from a Greek artist or two into his own country. His works, as may easily be imagined, were in a very ordinary style, but they received the applause and admiration of his fellow citizens; and if Cimabue had not found admirers, Florence in all probability would not have been honoured with Michael Angelo. The number of painters became soon so considerable in Florence, that in the year 1305 they established a society under the protection of St. Luke.

Massolino, towards the beginning of the 15th century, gave more grandeur to his figures, adjusted their dress better, and shed over them a kind of life and expression. He was surpassed by Massacio his pupil; who first gave force, animation, and relievo to his works.

Andrew Castagna was the first Florentine who painted in oil. But Leonardo da Vinci and Michael Angelo, contemporary painters, were the glory of the school of Florence. Michael Angelo was superior to Leonardo in grandeur, in boldness of conception, and in knowledge of design; but Leonardo was superior to him in all the amiable parts of the art. Leonardo, possessed of a fine imagination, and full of sensibility, devoted himself in painting to express the affections of the soul; and if, in this sublime branch of the art, he was afterwards surpassed by Raphael, he had at least the glory not only of exceeding all the painters who went before him, but of pursuing a path which none of them had attempted. His design was pure and neat, and not wholly destitute of greatness. He never went beyond nature, and he made a good choice of objects for imitation.

Michael Angelo, less formed to experience sweet affections than vehement passions, sought in nature what the strength of man might accomplish, not that which constitutes beauty. He delighted in being great and terrible, more than in graceful and pleasant attitudes. Well acquainted with anatomy, he knew more exactly than any other artist in what manner to express the joining of the bones of the body, and the office and insertion of the muscles; but too eager to display his knowledge of anatomy, he seems to have forgotten that the muscles are softened by the skin which covers them; and that they are less visible in children, in women, and in young men, than in confirmed and vigorous manhood. "In his figures (says Mengs) the articulations of the muscles are so easy and free, that they appear to be made for the attitude in which he represents them. The fleshy parts are too much rounded, and the muscles are in general too large and of too equal strength. You never perceive in his figures a muscle at rest; and although he knew admirably well how to place them, their action is very frequently inconsistent with their situation."

"He did not possess (says sir Joshua Reynolds) so many delightful parts of the art as Raphael; but those which he had acquired were of a more sublime nature. He saw in painting little more than what might be attained in sculpture; and he confined it to exactness of form and the expression of passions."

He informs us, in one of his letters, that he modelled in earth or wax all the figures which he intended to paint. This method was familiar to the great painters of his time, and ought never to be abandoned. It appears, that in representing them in this manner in relievo, the painter can imitate them much more exactly than when they are drawn with a crayon or pencil on a plain surface.

"Michael Angelo (continues sir Joshua Reynolds) never attempted the lesser elegancies and graces in the art. Vasari says, he never painted but one picture in oil; and resolved never to paint another, saying it was an employment only fit for women and children.

"If any man had a right to look down upon the lower accomplishments as beneath his attention, it was certainly Michael Angelo; nor can it be thought strange, that such a mind should have slighted, or have been withheld from paying, due attention to all those graces and embellishments of art which have diffused such lustre over the works of other painters."

Ancient Rome, rich with the works brought from Greece, or finished in its own bosom by Grecian artists, handed down in its ruins the remains of that glory to which it had been elevated. It was by the study of these remains that the modern artists were formed: they derived from them the knowledge of design, the beauty of exquisite forms, greatness of style, and justness of expression, carried to that length only which did not affect the beauty of the figure. From them also they derived the principles of the art of drapery; and they followed these principles even while they made the drapery of modern paintings more large and flowing than what was practised by the ancient sculptors. The Roman school was altogether devoted to the principal parts of the art, to those which require genius and vast conceptions; and was no farther occupied with colours than what was necessary to establish a difference between painting and sculpture, or rather between painting varied with colours and in clara-obscuro.

Raphael Sanzio, born at Urbino in 1483, and scholar to Pietro Perugeno, was the undoubted founder of this school. His first manner was that of Perugeno his master; but he travelled twice to Florence to study the great artists who flourished in that city.

It was fortunate for Raphael, says Mengs, that he was born in what he terms the infancy of the art, and that he formed himself by copying nature

before he had access to see the works of any great master. He began by studying, with great exactness, the simple truth in his figures. He was then ignorant that any choice was necessary; but he saw the works of Leonardo da Vinci, of Massacio, and of Michael Angelo, which gave his genius a new direction. After this he perceived that there was something more in the art of painting than a simple imitation of truth. But the works of those masters were not sufficiently perfect to point out the best choice to make; and he continued in uncertainty till he saw at Rome the works of the ancients. Then he perceived that he had found the true models which he wanted; and in imitating them he had only to follow the natural impulse of his genius.

Habituated by his first manner to imitate nature with precision, it was not difficult to carry the same exactness into the imitation of the ancients; and it was a great advantage to him that he flourished in an age wherein the artists were not arrived at facility of execution at the expence of rigorous exactness. He never lost sight of nature; but he was instructed by the ancients in what manner she should be studied. He perceived, that the Greeks had not entered into minute details, that they had selected what was great or beautiful, and that one of the chief causes of the beauty of their works was the regularity of their proportions: he began, therefore, by carefully studying this part of the art. He saw also that the joinings of the bones, and the free play of their articulations, are the causes of all graceful movement: he therefore, after the example of the ancients, gave the greatest attention to this part, and was led by these observations not to be contented with the simple imitation of nature.

His design is excellent, but neither so perfect nor so finished as that of the Greeks. He excelled in representing the character of philosophers, apostles, and other figures of that kind; but he did not equal the Greeks in ideal figures, which ought to carry the impression of divinity. His taste for design was more Roman than Greek, because he formed it chiefly on the basso-relievos which he found at Rome. On this account he had the habit of marking strongly the bones and the articulations, and labouring the fleshy parts less; but as these basso-relievos are very exact with regard to the reciprocal proportions of every member, he excelled in this part, while at the same time he did not give to his figures all the elegance of the Greek artists, nor the flexibility of articulation which is admired in the Laocoon, in the Apollo of Belvidere, and in the Gladiator.

The manners and spirit of his age, and the subjects which he most commonly treated, prevented him from reaching the ideal of the ancients. Having seldom occasion to represent figures altogether ideal, he devoted himself to purity of expression. He knew that the expression of the passions of the soul is absolutely necessary in an art which represents the actions of men, since from those affections the actions may be said truly to originate. To make figures act, and yet neglect the interior springs of action, is nothing more than a representation of automata. The attitudes and action are evident; but they appear not to act of themselves, because they are void of those principles from which alone men are supposed to act. An artist who neglects expression, gives no just representation of character, even though he should take nature for his model.

Raphael's first care, when he wanted to compose a piece, was to weigh the expression; that is to say, to establish, according to the nature of the subject, the passions which were to animate the characters. All the figures, all the accessories, all the parts of the composition, were moulded to the general expression.

As he had not found examples in the ancient statues of the claro-obscuro, he was comparatively weak in this part; and if there was any thing remarkable in his distribution of light and shade, he owed it to the works of the Florentine painters. It cannot be said, however, even with regard to the claro-obscuro, that he imitated nature without taste. He delighted in what are called masses of light; and disposed the great lights in the most conspicuous places of his figures, whether naked or in drapery. If this method did not produce effects highly illusive, it gives his works that distinctness which makes his figures conspicuous at a distance; and this must be allowed to be an essential part of the art of painting. He did not proceed beyond this; and content with that kind of claro-obscuro which comprehends imitation, he never attempted that which is ideal.

The composition and the ensemble of his figures were the chief excellences of Raphael. His philosophical mind could not be affected with objects which had not expression. He had too high an idea of painting to consider it as a mute art; he made it speak to the heart and soul; and he could only do this in subjects which required expression. If Raphael did not reach the Greek excellence, if he did not possess the art of embellishing nature in the same high degree, he saw at least, and imitated her in whatever was expressive and beautiful. "The Greeks sailed with majesty," says Mengs, "between earth and heaven: Raphael walked with propriety on the earth."

"Composition is in general," says the same author, "of two kinds: Raphael's is the expressive kind; the other is the theatrical or picturesque, which consists of an agreeable disposition of the figures. Lanfranc was the inventor of this last, and after him Pietro de Cortona. I give the preference to Raphael; because reason presides over all his works, or at least the greatest part of them. He never allowed himself in common ideas, and was never allured to give any thing in his accessory figures, which might turn the attention from the principal object of the piece."

A history of the schools is nothing more than a history of the painters who founded them. In those two which we have already given, Michael Angelo and Raphael come readily forward to claim our attention; and therefore we cannot do better, than conclude the account by the masterly contrast of these eminent painters given by sir Joshua Reynolds. "If we put those great artists," says he, "in a light of comparison with each other, Raphael had more taste and fancy, Michael Angelo more genius and imagination. The one excels in beauty, the other in energy. Michael Angelo has more of the poetical in operation; his ideas are vast and sublime; his people are a superior order of beings; there is nothing about them, nothing in the air of their actions, or their attitudes, or the style and cast of their limbs or features, that puts one in mind of their belonging to our species. Raphael's imagination is not so elevated; his figures are not so much disjointed from our own diminutive race of beings, though his ideas are chaste, noble, and of great conformity to their subjects. Michael Angelo's works have a strong, peculiar, and mark-

ed character; they seem to proceed from his own mind entirely; and that mind so rich and abundant, that he never needed, or seemed to disdain, to look abroad for foreign help. Raphael's materials are generally borrowed, though the noble structure is his own. The excellency of this extraordinary man lay in the propriety, beauty, and majesty of his characters; his judicious contrivance of composition, correctness of drawing, purity of taste, and the skilful accommodation of other men's conceptions to his own purpose."

This school is the child of nature. The Venetian painters, not having under their eyes like the Roman the remains of an antiquity, were destitute of the means of forming a just idea of the beauty of forms and of expression. They copied without choice the forms of nature; but they were chiefly delighted with the beauties which presented themselves in the mixture and the variety of natural colours. Their attention not being detached from this part by any thing of greater importance, colouring was their chief object, and they succeeded in it. They did not rest contented with characterizing the objects by comparison, in making the colour proper for one of more value by the colour more proper for another; but they endeavoured still farther, by the agreement and opposition of the coloured objects, and by the contrast of light and shade, to produce a vigorous effect, to demand and fix the attention. Dominic, who was said to have perished at Florence by the jealousy of Andre Castagna, and who was the second Italian artist who painted in oil, had educated, before he quitted Venice, his native country, Jacques Bellin, who was remarkable for nothing but the picturesque education which he gave to Gentel and John his two sons.

Gentel, who was the eldest, painted chiefly in water colours. John contributed much to the progress of his art in painting constantly in oil, and after nature. Although he always retained great stiffness in his manner, he had less than his father or brother. Great neatness of colouring, and an approach to harmony, are evident in his works. His taste in design is Gothic, the air of his heads is sufficiently noble, his attitudes are without judgment, and his figures without expression. He had for scholars Giorgion and Titian, who deserve to be considered as the founders of the Venetian school.

Giorgion distinguished himself by a design of a better taste than that of his master: but he chiefly surpassed him in colouring. He died in his 32d year; and excited the emulation of Titian, who soon greatly excelled him.

Tiziano Vecelli, known best by the name of Titian, was instructed to copy nature in the most servile manner in the school of John Bellin; but when he had seen the works of Giorgion, he began to study the ideal in colouring.

The truth of history is not to be expected in his historical paintings, or in those of the artists of the same school. He seems to have paid little attention to the consistence of scene, to the costume, to expression adapted to the subject, or finally, to the accommodation of parts which characterise the works of those who have studied the ancients. He was in short a great painter, and nothing more.

But although he deserves not to be placed among the most distinguished artists in point of judgment, yet he is by no means destitute of great and noble conceptions. There is often to be found among his male figures a considerable degree of grandeur: but if he has sometimes, like Michael Angelo, overcharged his design, it was more discovered in the swelling of the soft and fleshy parts, than in vigour and muscular strength.

Almost entirely devoted to simple imitation, he had scarcely greater choice in the claro-obscuro than in design. He cannot be justly reproached at the same time for weakness in this particular; because in endeavouring to imitate the colours of nature, he was obliged to observe the degrees of light. And in proportion as he succeeded in the imitation of natural colours, he must be less defective in the claro-obscuro: but it is not in the knowledge of this part of the art that we are to seek for the beauties of his works. These are to be found in the happy dispositions of colours both proper and local, and he carries this to the highest point of perfection.

The artists in the Florentine and Roman schools painted most commonly in water colours or in fresco; and in the exercise of their profession, instead of nature, they finished their works from their first sketches. Titian painted in oil, and finished from the objects in nature; and this practice, joined to his exquisite talents, gave the greatest truth to his colours. His being a portrait painter was also of advantage to him as a colourist. In this department he was accustomed to the colours of nature in carnations and draperies. He was a landscape-painter; and here also he took the colours from nature.

"As Titian perceived," says Mengs, "that the objects which are beautiful in nature have often a bad effect in painting, he found it necessary to make a choice in the objects of imitation; and he observed, that these were objects of which the local colours were extremely beautiful, which nevertheless were in a great measure destroyed by the reflection of light, by the porosity of the body, and by different luminous tints, &c. He perceived also, that in every object there was an infinite number of half tints, which conducted to the knowledge of harmony. In short, he observed in the objects of nature a particular agreement of transparency, of opacity, of rudeness, and of polish, and that all objects differed in the degrees of their tints and their shades. It was in this diversity he sought the perfection of his art; and in the execution he moderated the effect of natural colours. For example, in a carnation which had many demi-tints, he confined himself to one; and he employed even less than a demi-tint, where there were few in the natural object. By these means he obtained a colouring exquisitely fine; and in this part he was a great master, and deserves to be carefully studied."

Titian has in general little expression in his pictures, and he sometimes introduces figures which augment the coldness of the piece; for if it be true that the heads, even in historical painting, ought to be studied after nature, it is true also that an individual nature ought not to be presented, but one general and ideal. It is necessary that they should be men, while they resemble not men we are accustomed to see. The painter fails in the effect which he ought to produce, if, when he represents Achilles, Hector, and Cæsar, his personages are familiar to our observation.

The colours of his paintings are so mingled together, as to give no idea of the colours on his pallet; which distinguishes him from Rubens, who placed his colours one at the side of another. It is impossible to say, on the narrowest inspection, with what colours he produced his tints. This

practice, which enabled him to imitate so exactly the colours of nature, gives a marked distinction to his manner of painting. In the examination of his works, the critics lose an ordinary source of pleasure which arises from marking the freedom of hand; but they may console themselves with the natural and exquisite touches of this artist.

He is of historical painters one of those who have succeeded in landscape. His situations are well chosen; his trees are varied in their forms, and their foliage well conceived. He had a custom of representing some remarkable appearance in his landscapes to render them more striking.

The distinguishing characteristics of this school are, grace, an agreeable taste for design, without great correction, and mellowness of pencil, and a beautiful mixture of colours.

Antonio Allegri, called Corregio, was the father and greatest ornament of this school. He began like the painters of his time to imitate nature alone; but, as he was chiefly delighted with the graceful, he was careful to purify his design from all short turnings and unnecessary angles. He perceived that largeness contributed to grace; and therefore he not only rejected all small figures, but enlarged as much as possible the outlines, avoided acute angles and straight lines, and by these means gave an easy grandeur to his design. He made his figures elegant and large; he varied the outlines by frequent undulations; but he was not always pure and correct.

Corregio painted in oil, a kind of painting susceptible of the greatest delicacy and sweetness; and as his character led him to cultivate the agreeable, he gave a pleasing captivating tone to all his pictures. He sought transparent colours to represent shades conformable to nature, and adopted a manner of glazing which actually rendered his shadows more obscure. Obscurity in painting cannot be fully obtained without transparent colours; for these absorb the rays of light, and of consequence give less reflection. He laid his colours very thick on the brightest parts of his pictures, to make them capable of receiving, by a proper touch, the greatest degree of light. He perceived, that the reflections of light correspond with the colour of the body from which they are reflected; and on these principles he founded his theory of colours with respect to light and shade and reflection. But it is chiefly in the colour of his shades that he deserves to be imitated; for his lights are too clear, and somewhat heavy; and his fleshy parts are not sufficiently transparent.

Harmony and grace are connected together; and on this account Corregio excelled also in harmony. As the delicacy of his taste suffered him not to employ strong oppositions, he naturally became a great master in this part, which chiefly consists of easy gradations from one extreme to another. He was harmonious in his design, by making the lines which formed the angles of the contour arched and undulated. Both in the lights and shades, he placed always between the two extremes a space which served to unite them, and to form a passage from the one to the other. The delicacy of his organs made him perceive, better than any other artist, what relief was necessary to the eye after a violent exertion; and he was therefore careful to follow a bold and prevailing colour with a demi-tint, and to conduct the eye of the spectator, by an invisible gradation, to its ordinary state of tension. In the same manner (says Mengs) does agreeable and melting music pull one so gently out of sleep, that the awaking resembles enchantment more than the disturbing of repose. A delicate taste in colours, a perfect knowledge of the claro-obscuro, the art of uniting light to light, and shade to shade, together with that of detaching the objects from the ground, inimitable, grave, and perfect harmony, were the qualities which distinguished Corregio from all the painters, and placed him near the head of his profession.

The Carracci, Lewis, Augustin, and Hannibal, formed what is called the second Lombard school, which is frequently distinguished by the name of the school of Bologna.

Lewis was the master of the other two: he had studied the works of Titian and Paul Veronese at Venice, those of Andre del Sarte at Florence, those of Corregio at Parma, and those of Jules Romaeu at Mantua; but he chiefly endeavoured to imitate the manner of Corregio. Hannibal fluctuated between Corregio and Titian. Augustin their rival in painting had his mind cultivated by learning, and devoted part of his time to poetry and music, to dancing and to other manly exercises. These three painters often employed their talents on the same piece; and it was admirable that their united labours seemed to be animated with the same spirit.

They established an academy at Bologna, which their zeal for the advancement of their art made them call l'Academia degli Desiderosi; but it was afterwards called the Academy of the Carracci, because the reputation which these artists acquired permitted not a more illustrious name to be given to an establishment of which they were the founders. In this school were taught the art of constructing models, perspective, and anatomy; lessons were given on the beautiful proportions of nature, on the best manner of using colours, and on the principles of light and shade. They held frequent conferences, in which not only artists, but men of general knowledge, were permitted to elucidate points relative to the art of painting: but they were separated upon Hannibal's going to Rome to adorn the gallery of the cardinal Farnese.

The works of the Carracci are often, from the resemblance of their manner, confounded together, especially those which were finished previous to the residence of Hannibal at Rome. Meanwhile each of them has a decided character distinct from the other two. Lewis had less fire, but more of gracefulness and grandeur: Augustin had more spirit in his conception, and more pleasantness in his execution: Hannibal is characterized by boldness, by a design more profound, by an expression more lucky, and by an execution more solid.

Sir Joshua Reynolds, who saw the works of Lewis at Bologna, holds him out in his discourses as the best model for what is called style in painting; which is the faculty of disposing colours in such a manner as to express our sentiments and ideas. "Lodovico Carracci," says he, "(I mean in his best works) appears to me to approach the nearest to perfection. His unaffected breadth of light and shadow, the simplicity of colouring, which, holding its proper rank, does not draw aside the least part of the attention from the subject, and the solemn effect of that twilight which seems diffused over his pictures, appears to me to correspond with grave and dignified subjects better than the more artificial brilliancy of sunshine which enlightens the pictures of Titian."

Hannibal is esteemed by the best judges as a

model for beauty and design. Those who blame him for becoming less a colourist at Rome than he was at Bologna, ought to recollect that it is his performances at Rome which have chiefly secured his reputation. Severe critics have maintained that his design is too little varied in his figures; that he excels only in male beauty; that in imitating ancient statues, he excites some resemblance, but without arriving at the sublimity of ideas and of style which characterize the ancients; or, in other words, that he hath successfully imitated the exterior of their manner, but that he was incapable of reaching the interior and profound reasonings which determined those admirable artists.

The success of Hannibal, and the reputation which he acquired, have been pernicious to the art. His successors, deluded by these considerations, have made him the object of their imitation, without ascending to the scources from which he derived his knowledge, and which he never could equal. The result has been, that, instead of becoming equal to Hannibal, they have often copied his imperfections.

This school has been so different under different masters, that it is difficult to characterize it. Some of its artists have been formed on the Florentine and Lombard manner, others on the Roman, others on the Venetian, and a few of them have distinguished themselves by a manner which may be called their own. In speaking in general terms of this school, it appears to have no peculiar character; and it can only be distinguished by its aptitude to imitate easily any impression; and it may be added, speaking still in general terms, that it unites, in a moderate degree, the different parts of the art, without excelling in any one of them.

It is equally difficult to determine the progress of painting in France. Miniature painting, and painting on glass, were early cultivated in that country; and in these two kinds, the Italians had often recourse to the French artists. When Francis I. encouraged Rosso, a Florentine, and Primaticc, a Bolognian, the painters in France were not remarkable for any superior talent; but they were capable of working under these foreign artists.

Cousin, a painter on glass, and portrait-painter, was the first who established any kind of reputation in France. He was correct, but possessed very little elegance of design.

Painting, for some time encouraged by Francis I. fell into a state of languor, from which it was not recovered till the reign of Louis XIII. Jacques Blanchard, formed at the Venetian school, and called the French Titian, flourished about this period. But as he died young, and without educating any pupils to perpetuate his manner, he must be regarded as a single good artist, and not as a founder of the French school.

In the same manner Poussin, one of the greatest French painters, and whom they call the Raphael of France, educated no pupils, nor formed any school. His style and character of painting are described by sir Joshua Reynolds as simple, careful, pure, and correct. No works of any modern (adds the same author) have so much of the air of antique painting as those of Poussin. His best performances have a remarkable dryness of manner, which, though by no means to be recommended for imitation, yet seems perfectly correspondent to that ancient simplicity which distinguishes his style.

In the latter part of his life he changed from this manner to one much softer and richer; where there is a greater union between the figures and the ground. His favourite subjects were ancient fables; and no painter was ever better qualified to paint such subjects, not only from his being eminently skilled in the knowledge of the ceremonies, customs, and habits of the ancients, but from his being so well acquainted with the different characters which those who invented them gave their allegorical figures.

If Poussin, in the imitation of the ancients, represents Apollo driving his chariot out of the sea by way of representing the sun rising, if he personifies lakes and rivers, it is no way offensive in him, but seems perfectly of a piece with the general air of the picture. On the contrary, if the figures which people his pictures had a modern air or countenance, if they appeared like our countrymen, if the draperies were like cloth or silk of our manufacture, if the landscape had the appearance of a modern view, how ridiculous would Apollo appear? instead of the sun, an old man; or a nymph with an urn, instead of a river or a lake.

Poussin, however, more admired than imitated, had no manner of influence in forming the French school. Simon Vouet, his enemy and persecutor, had this honour, because his pupils, in the happy age of the arts in France, conferred on it the greatest splendor. Vouet was a man of distinguished abilities; but the school which he erected would have had no continuance if his scholars had pursued his manner of painting. He had a kind of grandeur and facility; but his design was false with regard to colours, and without any idea of expression. It was said of him, that he only needed to take the pencil in his hand to finish with one stroke the subject which he had conceived; and on this account one is tempted to be pleased, because he is astonished. He had the merit of destroying the insipid manner which reigned in France, and of pointing the way to a better taste.

If Vouet laid the foundation of the French school, Le Brun finished the edifice. When Le Brun was placed under the tuition of Vouet, he astonished his master and the rest of his pupils with the rapidity of his progress. At the age of twenty-six he finished his piece called the horses of Diomede, which gained a place in the palace royal, beside those of the most eminent painters. He was afterwards recommended to Poussin; but the young artist was more disposed by his natural inclinations to that modern part of the art which is called the great machine, than to the profound and studied manner of the Greek artists. Poussin, at the same time, was of great service to him, in recommending to his study the monuments, the customs, the dress of the ancients; their architecture, their rites, their spectacles, their exercises, their combats, and their triumphs.

Le Brun had a noble conception and a fruitful imagination. He was on no occasion inferior to the vast compositions which he undertook, and he chiefly excelled in rigorous costume and exact likenesses.

Few painters have united so great a number of essential qualities and accessories of the art; and if he had superiors, it consisted in this, that they possessed some particular quality in a more eminent degree.—He was a good drawer, but his design was far from being so elegant as that of Raphael, or so pure as that of Dommenique, and it was less lively than that of Hannibal Carracci,

whom he had taken for a model. In drapery he followed the Roman school: the clothes which he gave to his figures were not like those of the Venetian school, of such and such a stuff; they were draperies and nothing more, and this manner agreed with the heroic style of his works; but in this part he was not equal to the painter of Urbino. He had studied the expression of the affections of the soul, as is evident from his treatise on the character of the passions: but after observing the general characters, and establishing the principal strokes of expression, he thought he reached the whole extent of this subject, which is so infinitely extended. He always employed the few characters which he had once found out, and neglected to study the prodigious variety of gradations by which the interior affections are manifested in the exterior appearance. He fell then into the manner of repeating always; and possessed neither the delicacy, nor the depth, nor the extreme justness, of Raphael's expression. He loved and possessed in a high degree the grand machine of the art; he was delighted with great compositions; and he gave them life, and animation, and variety; but he wanted the vigour and inspiration of Raphael. His compositions are formed on philosophical principles, but those of Raphael are created. Le Brun thought well; Raphael, Poussin, le Sueur, thought most profoundly.—Le Brun had elevation, but he was not elevated like Raphael, to the sublime.

In colouring, Le Brun did not imitate the painters of the Venetian school. The sweet attractions and strong and solid colours of the schools of Rome and Lombardy seem rather to have been the object of his imitation; and from them also he learned an easy, agreeable, and bold management of the pencil.

As Le Brun possessed a great share of lively imagination, he delighted in allegory, which gives the greatest scope for ingenious invention. The fecundity and resources of his imagination appeared still farther, in his inventing symbols for his allegorical figures without resting contended with those employed by the ancients. But fanciful representations of this kind are distant from the operations of true genius. Spirit and thought in the arts are very different from spirit and thought in literary productions. A painter of moderate abilities may introduce into his works a great deal of the invention which belongs to poetry without enriching his peculiar art. The true spirit of painting consists in making the figures appear in the very circumstances and attitudes in which they are supposed to act, and penetrated with the sentiments with which they ought to be affected. By these means the spectator is more certainly interested than if the actions and thoughts were represented by allegorical symbols. Poussin appears to have less waste of spirit and imagination than Le Brun, while at the same time he gives more delight to people of spirit and imagination.

Eustach le Sueur was the contemporary and rival of Le Brun; and no painter approached nearer to Raphael in the art of drapery, and in disposing the folds in the most artful and the noblest manner. His design was in general more slender than that of Raphael, but, like his, it was formed on the model of the ancients. Like Raphael, he represented with art and precision the affections of the soul; like him, he varied the hair of the head, according to the condition, the age, and the character of his personages; and, like him, he made the different parts of every figure contribute to the general effect. His intention in composing was to express his subject, not to make shining contrasts or beautiful groups of figures; not to astonish and bewitch the spectator by the deceitful pomp of a theatrical scene, or the splendor of the great machine. His tones are delicate, his tints harmonious, and his colours, though not so attractive as those of the schools of Venice and Flanders, are yet engaging. They steal peaceably on the soul, and fix it without distraction on the parts of the art, superior to that of colouring.

His preaching of St. Paul, and the picture which he painted at St. Gervais, which the critics compare with the best productions of the Roman school, and the 22 pictures which he painted for the Carthusian monastery at Paris, and which were lately in possession of the king, are esteemed his best pieces. His contemporaries affirm, that he considered as sketches merely those excellent performances which are the glory of the French school.

If Le Sueur had lived longer, or if, like Le Brun, he had been employed under a court, fond of the arts and of learning, to execute the great works of the age, the French school would have adopted a different and a better manner. The noble beauty of his heads, the simple majesty of his draperies, the lightness of his design, the propriety of his expression and attitudes, and the simplicity of his general disposition, would have formed the character of this school. The deceitful pomp of theatrical decoration would have been more lately introduced, or perhaps would never have appeared, and Paris might have been the counterpart to Rome. But as Le Brun, by an accidental concurrence of favourable circumstances, was the fashionable painter, to be employed or rewarded it was necessary to imitate his manner; and as his imitators possessed not his genius, his faults became not only current but more deformed.

The French school not long ago changed its principles; and, if, when peace shall be restored to that nation, they continue to follow the road which, while the arts flourished among them, they marked out for themselves, they have the chance of becoming the most rigid observers of the laws imposed on the Greek artists. The count de Ceyles, pupil of Bouchardion, who by his rank and fortune had the means of encouraging the imitators of the ancients, and of the masters of the 15th century, first formed the design of restoring a pure taste to the art of painting. He was seconded by the talents of M. Vien, an artist who had only occasion to have his lessons and his example laid before him. In this manner commenced a revolution, so much the more wonderful, as it was scarcely ever known that any nation substituted a system of simple and rigid excellence in place of a false and glittering taste. The history of all nations, on the contrary, discovers a gradual progress from a rude beginning to perfection, and afterwards to irremediable decay. The French had the prospect of stopping short in this ordinary course. They began in a manner which promised success; and the best consequences may be expected, if the internal commotions of France do not destroy the taste for the arts in that country.

In Germany there can hardly be said to be a school, as it is a continuation of single artists, who derived their manner from different sources of originality and imitation. There were some German painters of eminence, when the art, emerging from its barbarous state, first began to be cultivated with success in Europe. As they were totally unacquainted with the ancients, and had scarcely access to the works of their contemporaries in Italy, they

copied nature alone, with the exception of somewhat of that stiffness which forms the Gothic manner. It is this manner, if we speak of the early German painters, which characterizes their school. But this is by no means the case with their successors, part of whom were educated in Flanders and part in Italy: for if Mengs or Dietrich were comprehended in this school, there would be nothing peculiar to its manner discovered in their works. And it is therefore necessary to confine our observations to the more ancient German painters, in whom the Gothic style is conspicuous.

Albert Durer was the first German who corrected the bad taste of his countrymen. He excelled in engraving as well as painting. His genius was fertile, his compositions varied, his thoughts ingenious, and his colours brilliant. His works, though numerous, were finished with great exactness; but as he owed every thing to his genius, and as works of inferior merit were by the false taste of the times preferred to his, it was impossible for him altogether to avoid the faults of his predecessors. He is blamed for stiffness and aridity in his outlines, for little taste or grandeur in his expression, for ignorance of the costume, of aerial perspective, and of gradation of colours; but he had carefully studied lineal perspective, architecture, and fortification.

John Holbeen or Holbein, nearly contemporary with Albert Durer, painted in oil and water colours. He excelled chiefly in history and in portrait painting. His colours are fresh and brilliant, and his works are highly finished; but in his historical subjects, his draperies are not in so good a taste as those of Albert Durer.

The Flemish school is recommended to the lovers of the art by the discovery, or at least the first practice of oil painting. Van Mander gives us the account of this wonderful discovery in the following words: "John Van Eyck was so excellent a chemist, that he discovered a method of varnishing his distemper colours with a varnish, which was made of some oils, and was very pleasing on account of the gloss and lustre it gave them. Many artists in Italy had vainly attempted to find out that secret; they never hit on the true method. It happened once that John, in his usual manner, having highly finished one of his pictures on boards, and having varnished it with his new invented varnish, exposed it to dry in the sun; but whether the boards were not well joined, or whether the heat of the sun was too violent, the boards split asunder and opened in the junctures. John saw with concern that his work was spoiled, and resolved to contrive something against future accidents of the same kind. Being disgusted at distemper painting and varnishing, he thought of a varnish that might dry without sunshine; and having tried many oils and substances, he found that linseed and nut oil dried better than any other. He boiled them with some other drugs, and produced the best varnish then known. Ever bent on improvement, he found, after much enquiry, that colours mixed with these oils worked and dried extremely well, and when dried would be waterproof. He observed likewise, that these oils would animate and give them a gloss and lustre without any farther varnishing." The truth, however, of this account is now very much questioned; and it is even proved by the manuscripts of Theophilus Presbyter, and also by some old oil paintings in England, that this method of painting was discovered long before the time of John Van Eyck. At the same time we admit, that John and his brother Hubert may have been the first who brought oil painting into general practice, not only by showing the excellence of which it was susceptible, but also by making several improvements on the art. And this is the more probable, from the great reputation which their pictures acquired over all Europe, by the softness and delicacy of their colours. The attention of the Italian painters was chiefly excited, insomuch that Antoine de Messina performed a journey into Flanders for the express purpose of acquiring the confidence of John Van Eyck, and of discovering the secret.

John de Bruges was the founder of painting as a profession in Flanders; Peter Paul Rubens was the founder of the art. This extraordinary person produced an immense number of works. He excelled equally in historical, portrait, and landscape painting; in fruits, flowers, and in animals. He both invented and executed with the greatest facility; and to show the extent of his powers, he frequently made a great number of sketches of the same subject altogether different, without allowing any time to elapse between them. The works of Rubens were destitute of that soft inspiration, productive of sweet and pleasant effects, so conspicuous in the works of Raphael; but he possessed that sprightliness of genius and strength of mind which is ever ready to burst forth in wonderful and astonishing effects. His figures appear to be the exact counter-part of his conceptions, and their creation nothing more than a simple act of the will.

His talent for design is unjustly censured, for on every occasion his design is noble and easy. He had great knowledge of anatomy, but he was hurried away by the impetuosity of his imagination and the ardor for execution; he preferred splendour to the beauty of forms, and sacrificed correctness of design too often to the magic of colours. In short, his qualities suppose a mind full of fire and vigour, rather than accuracy or profound thought. His drapery may be considered rather as fine than properly adapted to his figures: for, in the language of the art, to clothe and to give drapery are not synonymous terms. A portrait painter may excel in clothing his personages, while he is totally incapable of giving good drapery to an historical painting. His chief merit consists in colouring; though in this branch of the art he has not equalled Titian. He is the first among painters eminent for pomp and majesty; the first among those who speak to the eye, and the power of the art is often carried by him almost to enchantment.

It is evident from the works of Rubens, that his method of painting was to lay the colours in their place, one at the side of another, and mix them afterwards by a slight touch of the pencil. Titian mingled his tints as they are in nature, in such a manner as to make it impossible to discover where they began or terminated; the effect is evident, the labour is concealed. Thus Rubens is more dazzling and Titian more harmonious. In this part, the first excites the attention, the second fixes it. The carnations of Titian resemble the blush of nature; those of Rubens are brilliant and polished like satin, and sometimes his tints are so strong and separated as to appear like spots.

"Rubens (says Sir Joshua Reynolds) is a remarkable instance of the same mind being seen in all the various parts of the art. The whole is so much of a piece, that one can scarce be brought to believe but that if any one of them had been more correct and perfect, his works would not be so complete as they appear. If we should allow a greater purity and correctness of drawing, his want of sim-

plicity in composition, colouring, and drapery, would appear more gross."

In his composition his art is too apparent. His figures have expression and act with energy, but without simplicity or dignity. His colouring, in which he is eminently skilled, is notwithstanding too much of what we call tinted. Throughout the whole of his works there is a proportionable want of that nicety of distinction and elegance of mind which is required in the higher walks of painting; and to this want it may be in some degree ascribed that those qualities which make the excellency of this subordinate style appear in him with their greatest lustre. Indeed the facility with which he invented, the richness of his composition, the luxuriant harmony and brilliancy of his colouring, so dazzle the eye, that whilst his works continue before us, we cannot help thinking that all his deficiencies are fully supplied.

The Flemish school, of which Rubens is the greatest master, is remarkable for great brilliancy of colours and the magic of the *claro-obscura*. To these may be joined a profound design, which is yet not founded on the most beautiful forms; a composition possessed of grandeur, a certain air of nobleness in the figures, strong and natural expressions; in short, a kind of national beauty, which is neither copied from the ancients nor from the Roman nor Lombard schools, but which deserves to please, and is capable of pleasing.

To speak in general terms, and without regarding a great number of exceptions, the Dutch school carries none of the above qualities to great perfection, except that of colouring. Far from excelling in the beauty of heads and forms, they seem chiefly to delight in the exact imitation of the lowest and most ignoble. Their subjects are derived from the tavern, the smith's shop, and from the vulgar amusements of the rudest peasants. The expressions are sufficiently marked; but it is the expression of passions which debase instead of ennobling human nature. One would think that they practised the art of degrading the bodies and souls of men.

It must be acknowledged, at the same time, that the Dutch painters have succeeded in several branches of the art. If they have chosen low objects of imitation, they have represented them with great exactness; and truth must always please. If they have not succeeded in the most difficult parts of the claro-obscuro, they at least excel in the most striking, such as in light confined in a narrow space, night illuminated by the moon or by torches, and the light of a smith's forge. The Dutch understand the gradations of colours; and by their knowledge of contrast they have arrived at the art of painting light itself. They have no rivals in landscape painting, considered as the faithful representation or picture of a particular scene; but they are far from equalling Titian, Poussin, Claude Lorrain, &c. who have carried to the greatest perfection the ideal landscape, and whose pictures, instead of being the topographical representation of certain places, are the combined result of every thing beautiful in their imagination or in nature. The Dutch, however, distinguish themselves by their perspective, by their clouds, sea-scenes, animals, fruits, flowers, and insects; and they excel in miniature painting. In short, every thing which requires a faithful imitation, colour, and a nice pencil, is well executed by the Dutch painters.

Holland has also produced history painters, as Octavius Van Been, and Vander Hilst, the rival of Vandyke, and perhaps his superior: but it is not in the works of those artists that we find the character of the Dutch school.

Neither is the origin of their style to be derived from the works of Lucas of Leyden, though, from the time he flourished, viz. about the end of the 15th century, he may be considered as the patriarch of the Dutch school. Lucas painted in oil, in water colours, and on glass; and the kinds of his painting were history, landscape, and portrait. His picture of the Last Judgment is preserved in the Hotel-de-ville of Leyden; it possesses vast merit in point of composition, and a great variety of figures.

If miniature painting be considered as a characteristic of the Dutch school, Cornelius Polembourg may be regarded as the father of it. He possessed the colour, delicacy of touch, and disposition of the claro-obscuro, which chiefly distinguish this school; and if any thing is to be added, it is want of correctness in his design.

But if the choice of low figures is its chief characteristic, this is to be found in the greatest perfection in the works of the celebrated Rembrandt Vanryn; and it is the more offensive in this artist, as his compositions frequently required an opposite choice of figures. As his father was a miller near Leyden, his education must altogether have depended on the exertion of great talents and the study of nature. He studied the grotesque figure of a Dutch peasant, or the servant of an inn, with as much application as the greatest masters of Italy would have studied the Apollo of Belvidere, or the Venus de Medicis. This was not the manner of elevating himself to the noble conceptions of Raphael, but it was acquiring the imitation of truth in vulgar painting.

"Rembrandt (says M. Descamps) may be compared to the great artists for colour and delicacy of touch and claro-obscuro. It appears that he would have discovered the art, though he had been the first person that ever attempted it. He formed to himself rules and a method of colouring, together with the mixture of colours and the effect of the different tones. He delighted in the great oppositions of light and shade; and he seems to have been chiefly attentive to this branch of the art. His workshop was occasionally made dark, and he received the light by a hole, which fell as he chose to direct it on the place which he desired to be enlightened. On particular occasions he passed behind his model a piece of cloth of the same colour with the ground he wanted; and this piece of cloth receiving the same ray which enlightened the head, marked the difference in a sensible manner, and allowed the painter the power of augmenting it according to his principles.

"Rembrandt's manner of painting is a kin[illegible] magic. No artist knew better the effect[illegible] ferent colours mingled together, nor co[illegible] distinguish those which did not agree [illegible] which did. He placed every tone in its [illegible] so much exactness and harmony, that [illegible] not to mix them, and so destroy what may be called the flower and freshness of the colours. He made the first draught of his pictur[illegible] great precision, and with a mixture of colours altogether particular: he proceeded on his first sketch with a vigorous application, and sometimes loaded his lights with so great a quantity of colour, that he seemed to model rather than to paint. One of his heads is said to have a nose nearly as much projected as the natural nose which he copied."

Such is the power of genius, that Rembrandt, with all his faults, and they are enormous, is placed

among the greatest artists by M. Descamps, who saw his works, and was himself an artist. It is necessary to observe, that if Rembrandt was ignorant of the essential parts of his art, or neglected them, he was yet acquainted with expression, which alone was capable of giving animation to his works. His expressions are not noble, but they are just, lively, and executed with great judgment.

John de Laer, a miniature painter, and who made choice of his subjects from common life, deserves a distinguished place in the Dutch school. He painted hunting-scenes, the attacks of robbers, public festivals, landscapes, and sea views; and he ornamented his pictures with old ruins, and enriched them with figures of men and animals. He had a correct design, and employed vigorous and lively colouring.

Van-Ostade, although born at Lubeck, Gerard Dowu, Metzu, Miris, Wouwermans, Berghem, and the celebrated painter of flowers Van-Huysum, belonged to the Dutch school.

The greater part of the schools of which we have treated have no longer any existence. Italy alone had four schools, and there only remain at present a very few Italian artists known to foreigners. The school of Rubens is in vain sought for in Flanders. If the Dutch school still exists, it is not known beyond the precincts of Holland. Mengs a German artist has made himself famous in our days; but it was in Italy that he chiefly improved his talents and exercised his art. M. Dietrich, another German, has made himself known to strangers; but two solitary artists do not form a school.

It now only remains to speak of the art of painting in England, where it is at present making great advances towards excellence.

Painting has been cultivated in England at several periods with various success. We shall here give the account of it from Mr. West's letter in the third number of Academic Annuals, published by the Royal Academy of London.

"Many sovereigns of this country have noticed and patronized the fine arts. Edward the Third caused several chapels to be embellished with painted glass and enamelled monuments, as well as with paintings on the walls, representing scriptural subjects, and others from the church legends, together with portraits of then existing characters of both sexes. The chapel of St Stephen, Westminster, was the most conspicuous.

"Henry the Seventh gave patronage to many ingenious men, both in painting, sculpture, and architecture.

"Henry the Eighth followed the example of his father, in giving patronage to eminent men. He invited those of the greatest celebrity in painting in Italy, Germany, and Flanders, to visit his capital. Raphael and Titian he wished to see at his court; and he endeavoured to draw them thither by the most splendid offers: but not succeeding in his desire, he procured several of their works; in particular the picture of St. George, by Raphael, at present in the possession of the king of Spain, and the two pictures by Titian, now in the gallery of the marquis of Stafford; the subjects of which are, Diana and Acteon, and Diana and Callisto. He was more fortunate in his invitation to Holbein, at that time famous as a portrait painter, who resided in Henry's palace, and whose works were soon spread through the kingdom.

"Charles the First, more attached to the fine arts than any of his predecessors, formed a splendid collection of the works of the great Italian and Flemish masters. He invited to his court Rubens and Vandyke, and other painters of considerable eminence, from Flanders and Holland; and he gloried in counting among his natural subjects Inigo Jones, his architect, and Dobson, who rose to eminence in painting. These were the two first English artists who enjoyed the patronage of royal favour.

"Charles the Second was proud to follow the liberal example of his father, in bestowing rewards on ingenious artists. He patronized most of those who visited his court from Italy, Flanders, Germany, and Holland; of which the decorative paintings on the walls in Windsor-castle, and the palace of Hampton-court, by Verrio, and others, are evident proofs; beside many pictures from poetical subjects, by Gennari, as well as portraits by several painters of considerable eminence. The favours which this monarch showered on the arts were, however, confined to foreign artists.

"Queen Anne was the first of our sovereigns who called into activity the British pencil, as the paintings in the cathedral of St. Paul's and the hospital at Greenwich, by sir James Thornhill, and others under his direction, sufficiently evince. In architecture, sir Christopher Wren was equally distinguished by her favour.

"But to form the great epocha of patronage conferred by a British king on British subjects, in painting, sculpture, and architecture, was reserved for the reign of his present Majesty, George the Third

"In the year 1768, his majesty gave his royal sanction to a plan formed for the establishment of an academy of painting, sculpture, and architecture, of which he was graciously pleased to become the protector and patron.

"In the three branches of art which constitute that academy, he found many artists already formed: among others of considerable celebrity in painting, Reynolds, Wilson, Hayman, Gainsborough, Hoare, Danu, Mortimer, Barret, Sandby, Wright, Cotes, and West; in sculpture, Bacon, Nollekens, and Wilton; in architecture, Chambers, G. Dance, Stuart, T. Sandby, Gwyn, and the two Adams.

"At the same time, Strange, Woollett, Hall, Green, and Mac Ardell, shone with marked eminence among the engravers. The merits of our engravers, blended with the labours of the painter, opened a new avenue to fame. The harmonious softness of Strange; the united skill of Wilson and Woollett in landscape, as seen in the prints of Niobe, Phaeton, Ceyx, Celadon and Amelia, &c; the portraits in mezzotinto from sir Joshua Reynolds, by M'Ardell, Fisher, &c.; the successful combination of West with Earlom, Green, Woollett, Hall, &c. in historical works, as seen in the prints of Agrippina, Regulus, Hannibal, Wolfe, La Hogue, the Boyne, Penn, Cromwell, and the Restoration, &c. spread the celebrity of English works of art through the medium of engraving; and the circumstance of these prints rising to a higher price in every market throughout the continent than had ever been known in the annals of the arts, inspired those commercial views which afterwards produced the galleries of Shakspeare, under Boydell; the poets, under Macklin; historical, under Bowyer, &c. &c.; giving to this country a new source of commerce, highly beneficial to its interests, and unexampled in any other."

English school.—To the list of painters mentioned by West, are to be added several who unfortunately experienced no royal patronage.—Among these is Hogarth, whose unrivalled excellence in works of humour is principally known to us by the numerous engravings from his pictures.

Of the modern English school sir Joshua Reynolds was the founder, and his works still remain its greatest glory. They not only give him the most distinguished rank among the artists of the present age, but the effects produced by them on the rising artists, as well as by the elevated principles inculcated in his discourses delivered at the Royal Academy, will secure his reputation as long as England shall pay respect to superior talents. The English taste appears to be formed on the great masters of the Italian and Flemish schools. Reynolds professed an admiration and preference of Michael Angelo, but his own works are in no point similar to that great master of design.

The names of Gainsborough and Wilson stand the highest in landscape painting.

The painters of this school have been distinguished as less rigid with regard to the forms and correctness of their drawing, than ambitious of striking and poignant effect. "Beauty," says the French Encyclopædia, "ought to be the characteristic of the English school, because the artists have it so frequently displayed before their eyes. If this beauty is not precisely similar to the antique, it is not inferior to it.

"The English school should also be distinguished for the truth of expression, because the liberty enjoyed in that country gives to every passion its natural and unbiassed operation."

The best accounts of painting and painters are to be found in the works of Leonardo da Vinci, Alberti, Lomazzo, and Bellori; and in the Lives of the Painters, by Vasari and Du Piles; Felibien's Entretiens sur les Vies des Peintres, and his other writings; the Discourses delivered by Reynolds in the Royal Academy of London; the various Treatises by Mengs; Richardson on Painting; and De Arte Graphicâ, by Du Fresnoy.

The later publications of Barry, Shee in his Rhymes on Art, and Howe in his Inquiry into the present State of the Arts in England, convey the most accurate information concerning the progress of painting in this country.

PAINTURE. *s.* (*peinture*, Fr.) The art of painting (*Dryden*).

PAIR. *s.* (*paire*, Fr. *par*, Lat.) 1. Two things suiting one another: as, a *pair* of gloves. 2. A man and wife (*Milton*). 3. Two of a sort; a couple; a brace (*Ray*).

PAIR. Jugum. In botany, applied to the leaflets in pinnate leaves; which are said to be bijugate, trijugate, &c. from having two, three, &c. pairs of leaflets. Two-paired, three-paired, &c.

To PAIR. *v. n.* (from the noun.) 1. To be joined in pairs; to couple (*Shakspeare*). 2. To suit; to fit as a counterpart (*Shakspeare*).

To PAIR. *v. a.* 1. To join in couples (*Dryden*). 2. To unite as correspondent or opposite (*Pope*).

PAIRING, the uniting or joining in couples. The instinct of pairing is bestowed on every species of animals to which it is necessary for rearing their young; and on no other species. All wild birds pair; but with a remarkable difference between such as place their nests on trees and such as place them on the ground. The young of the former, being hatched blind, and without feathers, require the nursing care of both parents till they be able to fly. The male feeds his mate on the nest, and cheers her with a song. As soon as the young are hatched, singing yields to a more necessary occupation, that of providing food for a numerous issue; a task that requires the exertions of both parents.

Eagles and other birds of prey build on trees, or on other inaccessible spots. They not only pair, but continue in pairs all the year round; and the same pair procreates year after year. This at least is the case of eagles: the male and female hunt together, unless during incubation, at which time the female is fed by the male. A greater number than a single pair are never seen in company.

Gregarious birds pair in order probably to prevent discord in a society confined to a narrow space. This is the case particularly of pigeons and rooks. The male and female sit on the eggs alternately, and divide the care of feeding their young.

Partridges, plovers, pheasants, sea-fowl, grouse, and other kinds that place their nests on the ground, have the instinct of pairing; but differ from such as build on trees in the following particular, that after the female is impregnated, she completes her task without needing any help from the male. See ORNITHOLOGY.

PAISHAWUR, a city of Hindustan Proper, capital of a district in the country of Cabul. It is situate on the Kameh, 125 miles S.E. of Cabul, and 170 N. of Moultan. Lon. 70. 36 E. Lat. 33. 18 N.

PAISLEY, a town in Renfrewshire, with manufactures of silk and thread gauze, and extensive cotton works. Its streets have names descriptive of the various employments of the inhabitants; such as Silk Street, Cotton Street, Lawn Street, &c. The magnificent abbey, for which it was once noted, is now partly in ruins; but there is a chapel entire, which is used as the family burial-place of the marquis of Abercorn, and is famous for a surprising echo. Paisley contains about thirty-two thousand inhabitants, but it stands on nearly as much ground as Glasgow, and is six miles W. of that city. Lon. 4. 20 W. Lat. 55. [illegible]

PAITA, a seaport of Peru, in the [illegible] of Quito, with an excellent harbour. [illegible] frequently been plundered by the buccaneers, and, in 1741, it was plundered and burnt, by commodore Anson, because the governor refused to ransom it. Lon. 81. 10 W. Lat. [illegible] S.

PALACE, PALATIUM, a name generally given to the dwelling-houses of kings, princes, and other great personages; and taking different epithets, according to the quality of the inhabitants, as imperial palace, royal palace, pontifical palace, cardinal palace, ducal palace, episcopal palace, &c.

PALACIOS, a town of Spain, in Andalu-

sia, 12 miles S. of Seville. Lon. 5. 24 W. Lat. 37. 20 N.

PALÆMON, or PALEMON, a sea deity, son of Athamas and Ino. His original name was Melicerta. (See MELICERTA.) 2. A noted grammarian at Rome in the age of Tiberius, who made himself ridiculous by his arrogance and luxury.

PALÆSTRA, in Grecian antiquity, a public building where the youth exercised themselves in wrestling, running, playing at quoits, &c. To prevent the combatants from hurting themselves by falling, the bottom of the palæstra was covered with dust or gravel. Some will have the palæstra to be only a part of the gymnasium. Many authors imagine that the palæstra was of two kinds; the one for the exercise of the body, the other for the cultivation of the mind: but the derivation of the word seems to confine it to bodily exercise.

PALAFOX (John de), a Spaniard, patronized by Philip II. and appointed bishop of Los Angelos, in America, with the title of judge of the administration of the three viceroys of the Indies. In this office, though he had to encounter the prejudices of the jesuits, he maintained his character of moderation and of benevolence towards the unfortunate natives, and was made by the king bishop of Osma, 1653. He died 1659, universally respected. He wrote the history of the siege of Fontarabia, 4to.—history of the conquest of China by the Tartars, 8vo.—sermons, and religious tracts.

PALAIS, a town of France, capital of the island of Belleisle, off the coast of Bretagne. It has a strong citadel, which stood a long siege against the English, in 1761, and then surrendered on honourable terms. Lon. 3. 2 W. Lat. 47. 18 N.

PALAIS (St.), a town and district of France, in the department of Lower Pyrenees, which, with the town and district of St. John-Pied-de-Port, forms nearly the whole of the late province of Lower Navarre. This is only a very moderate portion of the kingdom of Navarre, wrested, in 1512, from John d'Albert, by Ferdinand, king of Arragon and Castile. This portion, separated from Upper Navarre by the Pyrenees, made part of the kingdom of France, having been annexed to it by Henry IV. who held it in right of his mother, Jeanne d'Albert. St. Palais is seated on the Bidouse, 25 miles S.E. of Bayonne. Lon. 1. 4 W. Lat. 43. 21 N. See NAVARRE.

PALAMBOANG, or PALAMBANG, a town of Java, capital of a kingdom; seated at the E. end of the island, on the straits of Bally. Lon. 114. 0 E. Lat. 7. 10 S.

PALAMCOTTA, or TINEVELLY, a town of Hindustan, in the Carnatic, 410 miles S.W. of Madras. Lon. 77. 54 E. Lat. 8. 43 N.

PALAMEDIA. Screamer. In zoology, a genus of the class aves, order grallæ. Bill conic, the upper mandible hooked; nostrils oval; feet four-toed, cleft, a very small membrane connecting the toes at the root. Two species.

1. P. cornuta. Horned screamer. Wings with two spines at the head; front horned. Inhabits the fenny and maritime parts of South America; three feet four inches long; always found in pairs, and feeds on herbs, seeds and reptiles; makes a nest of mud shaped like an oven, and lays two eggs; when alarmed rises from the ground, with a loud and continued screaming.

2. P. cristata. Crested screamer. Wings unarmed; front crested.

The offensive armour of the first species is peculiarly formidable. When the wings are folded, the two spurs upon each are directed forward, and appear to be elongations of the bones of which they are formed. The upper spur, on each wing, is two inches long, bending a little upwards, and terminating in a sharp point; the lower one is not more than half an inch in length, but nearly as thick. All those protuberances are of an horny substance, and, towards the base, covered with a kind of case, like the barrel of a large pen. With this formidable apparatus of offensive armour, the screamer is the most gentle of all animals; he never attacks another bird; his depredations being confined to the worms upon which he feeds. Such fidelity and attachment do these birds display, that the male and female continue inseparably together till death; and when one of them dies, the affection which united them, and pangs of grief for its loss partner, are long felt by the other. It is even said, that the disconsolate surviver wanders constantly around the place where its partner died, till, consumed with grief, it dies also.

The first species is about the size of a large swan. It is called by the natives kamichi. The head and upper part of the neck are covered with short bristly feathers; the rest of the plumage being longer, and of a dark brown colour mixed with a shade of green. The second species is called cariama; it is not larger than a heron; and as we have just observed, has, instead of the horn rising from the crown of the head, a feather standing up like a crest. The whole plumage of this species is grey, covered with brown; and nearly resembles that of the falcon. The kamichi and cariama are, by some naturalists, classed into two separate genera. In their general air and form, however, as well as in their manner of life, there is a similarity that indicates them both to belong to one tribe. They both live on marshy ground, and are supported, probably, by the same kinds of food. They are equally distinguished by the nakedness of their legs, and by their loud and piercing voice, though that of the cariama is inferior in strength to that of the kamichi. In America, this bird is by its voice discovered by the hunters, who pursue it for its flesh, and have begun to domesticate it from the same motive.

PALAMEDES, a Grecian chief, son of Nauplius, king of Eubœa by Clymene. He was sent by the Greek princes, going to the Trojan war, to bring Ulysses to the camp,

who, to avoid the expedition, pretended insanity, and used to sow salt instead of barley in the furrows. The deceit was soon perceived by Palamedes, and to demonstrate it, he took Telemachus, his son, and put him before the plough of his father. Ulysses showed that he was not insane, by turning the plough a different way not to hurt his child. This having been discovered, Ulysses was obliged to attend the Greek princes to the war, but an immortal enmity arose between Ulysses and Palamedes. The king of Ithaca bribed one of his servants, and made him dig a hole in his master's tent, and there conceal a large sum of money. After this Ulysses forged a letter, which king Priam was supposed to have sent to Palamedes, desiring that, according to the conditions which were previously agreed upon, when he received the money, he should betray the Grecian army. This letter was carried before the Grecian princes Palamedes was summoned, and protested his innocence, but all was in vain, the money was discovered in his tent. He was found guilty by all the army, and stoned to death. Homer is silent about the miserable fate of Palamedes. Palamedes was a learned man as well as a soldier, and according to some he completed the alphabet of Cadmus by the addition of the four letters θ, ξ, χ, φ, during the Trojan war. To him also is attributed the invention of dice and backgammon; and it is said that he was the first who regularly ranged an army in a line of battle, and who placed sentinels round the camp, and excited their vigilance and attention, by giving them a watch word.

PALAMOS, a strong seaport of Spain, in Catalonia, seated on the Mediterranean, 47 miles N.E. of Barcelona. Lon. 2. 58 E. Lat. 41. 58 N.

PALAMOW, a town of Hindustan Proper, in the province of Bahar, 210 miles S.S.W. of Patna. Lon. 84. 10 E. Lat. 23. 40 N.

PALA'NQUIN. *s.* A kind of covered carriage, used in the eastern countries, that is supported on the shoulders of slaves.

PALAOS ISLANDS. See PHILIPPINES, NEW.

PA'LATABLE. *a.* (from *palate.*) Gustful; pleasing to the taste (*Philips*).

PA'LATE. *s.* (*palatum*, Latin). 1. The instrument of taste; the upper part or roof of the mouth (*Hakewill*). 2. Mental relish; intellectual taste (*Taylor*).

PALATE, in botany. Gibbositas prominens in fauce corollæ. Philos. Bot. Processus labii inferioris superiora versus quo rictus occluditur. Delin. Pl. A prominency in the throat of a corol in labiate flowers; or a process of the lower lip, extending towards the upper part, by which the gape or opening is closed.

PALATI CIRCUMFLEXUS, in myology. See CIRCUMFLEXUS.

PALATI LEVATOR. See LEVATOR PALATI.

PALATI OSSA, in osteology. (from *palo*, to hedge in, because it is staked in as it were by the teeth.) These bones are of a very irregular figure. They are placed between the ossa maxillaria superiora and the os sphenoides, at the back part of the roof of the mouth, and extend from thence to the bottom of the orbit. Each of these bones may be divided into four parts; viz. the inferior or square portion, the pterygoid process, the nasal lamella, and orbitar process. The first of these, or the square part of the bone, helps to form the palate of the mouth. The upper part of its internal edge rises into a spine, which makes part of the septum narium. The pterygoid process, which is smaller above than below, is so named from its being united with the pterygoid processes of the sphenoid bone, with which it helps to form the pterygoid fossæ. It is separated from the square part of the bone, and from the nasal lamella, by an oblique fossa, which, applied to such another in the os maxillare, forms a passage for a branch of the fifth pair of nerves. The nasal lamella is nothing more than a very thin bony plate, which arises from the upper side of the external edge of the square part of the bone. Its inner surface is concave, and furnished with a ridge which supports the back part of the os spongiosum inferius. Externally, it is convex, and firmly united with the maxillary bone. The orbitar process is more irregular than any other part of the bone. It has a smooth surface where it helps to form the orbit; and, when viewed in its place, we see it contiguous to that part of the orbit which is formed by the os maxillare, and appearing as a small triangle at the inner extremity of the orbitar process of this last mentioned bone. This fourth part of the os palati likewise helps to form the zygomastic fossa on each side, and there its surface is concave Between this orbitar process and the sphenoid bone, a hole is formed, through which an artery, vein, and nerve, are transmitted to the nostrils. The ossa palati are complete in the fœtus. They are joined to the ossa maxillaria superiora, os sphenoides, os ethmoides, ossa spongiosa inferiora, and vomer.

PALATI TENSOR. See CIRCUMFLEXUS.

PA'LATIC. *a.* (from *palate.*) Belonging to the palate, or roof of the mouth (*Holder*).

PALATINATE, a province or signiory possessed by a palatine.

PALATINE, or COUNT PALATINE, a title anciently given to all persons who had any office or employment in the prince's palace: but afterwards conferred on those delegated by princes to hold courts of justice in the provinces; and on such among the lords as had a palace, that is, a court of justice, in their own houses.

PALATINE (Counties) in England. Chester, Durham, and Lancaster, are called counties-palatine. The two former are such by prescription, or immemorial custom; or, at least as old as the Norman conquest: the latter was created by king Edward III. in favour of Henry Plantagenet, first earl and then duke

of Lancaster; whose heiress being married to John of Gaunt, the king's son, the franchise was greatly enlarged and confirmed in parliament, to honour John of Gaunt himself, whom, on the death of his father-in-law, the king had also created duke of Lancaster. Counties-palatine are so called *a palatio*; because the owners thereof, the earl of Chester, the bishop of Durham, and the duke of Lancaster, had in those counties *jura regalia*, as fully as the king hath in his palace; *regalem potestatem in omnibus*, as Bracton expresses it. They might pardon treasons, murders, and felonies; they appointed all judges and justices of the peace; all writs and indictments ran in their names, as in other counties in the king's; and all offences were said to be done against their peace, and not, as in other places, *contra pacem domini regis*. And indeed by the ancient law, in all peculiar jurisdictions, offences were said to be done against his peace in whose court they were tried; in the court-leet, *contra pacem domini*; in the court of a corporation, *contra pacem ballivorum*; in the sheriff's court or tourn, *contra pacem vicecomitis*. These palatine privileges (so similar to the regal independent jurisdictions usurped by the great barons on the continent during the weak and infant state of the first feudal kingdoms in Europe) were in all probability originally granted to the counties of Chester and Durham, because they bordered upon enemies' countries, Wales and Scotland: in order that the owners, being encouraged by so large an authority, might be the more watchful in its defence; and that the inhabitants, having justice administered at home, might not be obliged to go out of the county, and leave it open to the enemy's incursions. And upon this account also there were formerly two other counties-palatine, Pembrokeshire and Hexhamshire, the latter now united with Northumberland; but these were abolished by parliament, the former in 27 Hen. VIII. the latter in 14 Eliz. And in 27 Hen. VIII. likewise, the powers before mentioned of owners of counties-palatine were abridged; the reason for their continuance in a manner ceasing: though still all writs are witnessed in their names, and all forfeitures for treason by the common law accrue to them. Of these three, the county of Durham is now the only one remaining in the hands of a subject.

The Isle of Ely is sometimes called a county-palatine; but that is erroneous: that is only a royal franchise, the bishop exercising jurisdiction by grant of king Henry I.

PALATINUS MONS, the largest of the seven hills on which Rome was built. Upon it Romulus laid the first foundation of the capital of Italy, and there also he kept his court, as well as Tullus Hostilius, and Augustus, and all the succeeding emperors, from which circumstance the word *palatium* has since been applied to the residence of a prince. Apollo, who was worshipped on the Palatine hill, was also called Palatinus. His temple there had been built by Augustus, who had enriched it with a library, valuable for the various collections of Greek and Latin manuscripts which it contained.

PALATO-PHARYNGEUS. Musculus palato-pharyngeus. Thyro-staphilinus of Douglas. Thyro-pharyngo-staphilinus of Winslow. A muscle situated at the side of the entry of the fauces. It arises by a broad beginning from the middle of the velum pendulum palati at the root of the uvula posteriorly, and from the tendinous expansion of the circumflexus palati. The fibres are collected within the posterior arch behind the tonsils, and run backwards to the top and lateral part of the pharynx, where the fibres are scattered and mixed with those of the stylo-pharyngeus. It is inserted into the edge of the upper and back part of the thyroid cartilage. Its use is to draw the uvula and velum pendulum palati downwards and backwards, and at the same time to pull the thyroid cartilage and pharynx upwards, and shorten it; with the constrictor superior pharyngis and tongue, it assists in shutting the passage into the nostrils; and in swallowing, it thrusts the food from the fauces into the pharynx.

PALATO-STAPHILINUS. See STAPHILINUS.

PALAVIA, in botany, a genus of the class monadelphia, order polyandria. Calyx single, five-cleft; style many-cleft; capsules numerous, collected into a head without order. Two species; natives of Lima; branching decumbent plants, with purple and purplish yellow flowers.

PALE. *a.* (*pale*, Fr. *pallidus*, Latin.) 1. Not ruddy; not fresh of colour; wan; white of look (*Shakspeare*). 2. Not high coloured; approaching to colourless transparency (*Arbuthnot*). 3. Not bright; not shining; faint of lustre; dim (*Shakspeare*).

To PALE. *v. a.* (from the adjective.) To make pale (*Prior*).

PALE. *s.* (*palus*, Latin.) 1. Narrow piece of wood joined above and below to a rail, to enclose grounds (*Shakspeare*). 2. Any enclosure (*Hooker*). 3. Any district or territory (*Clarendon*). 4. The *pale* is the third and middle part of the scutcheon (*Peacham*).

To PALE. *v. a.* (from the noun.) 1. To enclose with pales (*Mortimer*). 2. To encloses; to encompass (*Shakspeare*).

PALEA. In botany, a chaff. Lamella receptaculo innata flosculos distinguens. A thin membrane, springing from the receptacle, and separating the florets, in some aggregate flowers. Hence such a receptacle is called

PALEACEOUS, or CHAFFY. As in dipsacus, scabiosa, &c. See CHAFFY.

PALEACEOUS PAPPUS. A chaffy crown or down to some seeds; as in bidens, silphium, tagetes, coreopsis, &c.

PALEARIUS (Aonius), an eminent writer, born at Veroli, near Rome. He resided near Sienna, where he instructed some pupils in the learned languages. Here he had an unfortunate quarrel with a rival in literature, and afterwards, in consequence of his able defence of a certain nobleman, against the monks, he became an object of persecution, and retired to

Lucca, and next to Milan. Here he found himself exposed to fresh persecution; he was again accused by the monks of heresy, and being carried to Rome was condemned and burnt to death, 1566. The best known of his works is his Latin poem on the immortality of the soul, 3 vols. 8vo.

PA'LEEYED. *a.* (*pale* and *eye.*) Having eyes dimmed (*Pope*).

PA'LEFACED. *a.* (*pale* and *face.*) Having the face wan (*Shakspeare*).

PA'LELY. *ad.* (from *pale.*) Wanly; not freshly; not ruddily.

PALENCIA, a town of Spain, in Leon, and a bishop's see, with five churches, eleven convents, and two hospitals. It is seated on the Carrion, 23 miles N.N.E. of Valladolid, and 70 S.E. of Leon. Lon. 4. 28 W. Lat. 41. 59 N.

PA'LENESS. *s.* (from *pale.*) 1. Wanness; want of colour; want of freshness; sickly whiteness of look (*Pope*). 2. Want of colour; want of lustre (*Shakspeare*).

PA'LENDAR. *s.* A kind of coasting vessel.

PA'LEOUS. *a.* (*palea*, Lat.) Husky; chaffy.

PALERMO, a fortified city of Sicily, in Val di Mazara, capital of the island, and an archbishop's see. It stands on a bay of the same name, on the N. coast, near the extremity of a kind of natural amphitheatre, formed by high and rocky mountains. The country between the city and the mountains is one of the richest plains in the world; the whole appearing a magnificent garden, filled with fruitful trees, and watered by fountains and rivulets. The inhabitants of Palermo are estimated at 130,000. Two great streets intersect each other in the centre of the city, where they form a handsome square, called the Ottangolo, from the centre of which is seen the whole of these noble streets, and the four elegant gates which terminate them, each at the distance of half a mile. The Porto Felice opens to the Marino, a delightful walk, which has on one side the wall of the city, and on the other the sea; and in the centre is an elegant kind of temple, frequently made use of as an orchestra. The churches of Palermo are upward of 300, and many of them very rich and magnificent. The cathedral is a large Gothic structure, supported within by 80 columns of oriental granite, and divided into a great number of chapels, some of which are extremely rich, particularly that of St. Rosolia, the patroness of Palermo. The relics of this saint are preserved in a large box of silver, enriched with precious stones; and they are considered as the greatest treasures of the city. Here are also found the tombs of several of the ancient Norman kings, and of the emperors Henry VI. and Frederic II. of the finest prophyry. The city is crowded with statues of sovereigns and tutelar saints placed in small courts and squares, upon pedestals of colossal proportion and tasteless form. In the streets women hide their heads in black veils; a very ancient mode of dress in this island. This city has suffered greatly at different periods, by earthquakes and inundations. The harbour, defended by two castles, is dangerously open to the sea from the N.E.; and, even at the anchoring place, ships are in danger when a westerly wind rushes through the valley of Colli between the mountains. About the middle of the 11th century, the Norman king Roger established silk manufactures in this city, by means of prisoners taken in his war with the Greeks, and they still flourish, though not so lucrative since the manufacture has extended to Italy. One mile from Palermo is a celebrated convent of capuchins, in which is a vault made use of as a receptacle for the dead. It consists of four wide passages, each about forty feet in length, with arches along the sides, in which the bodies are set upright, clothed in coarse garments, with their heads, arms, and feet bare. They are prepared for this situation by keeping them six or seven months upon a gridiron, over a slow fire, till all the fat and moisture are consumed. In some of the higher niches they are laid ont at full length, and at the top are children of six or seven years of age. On the floor are handsome trunks, containing the bodies of persons of distinction, the keys of which are kept by the relations. Palermo, in 1799, became the residence of the court, when the French made themselves masters of Naples. It is 110 miles W. of Messina, and 180 S. by W. of Naples. Lon. 13. 23 E. Lat. 38. 15 N.

PALES, the goddess of sheepfolds and of pastures among the Romans, was worshipped with great solemnity at Rome, and her festivals called Palilia, were celebrated the very day that Romulus began to lay the foundation of the city of Rome.

PALESTINE, in its present state, is a part of Asiatic Turkey situated between 31° 30' and 33° 20' north latitude, and between 34° 50' and 37° 15' east longitude. It is bounded by Mount Libanus, which divides it from Syria, on the north; by Mount Hermon, which separates it from Arabia Deserta, on the east; by the mountains of Seir and the deserts of Arabia Petræa, on the south; and by the Mediterranean sea on the west.

This once fertile and happy spot was first called the land of Canaan, or Chanaan, from Noah's grandson. In Scripture, however, it [illegible] distinguished by other names; such as the Land of Promise, the Land of God, the Land of Israel, &c. It received the name of Palestine from the Palestines, or Philistines, who possessed a great part of it; and it had the name of Judæa, or Judæa Palestina, from Judah, the most considerable of the twelve sons of Jacob. The Christians have denominated it the Holy Land; partly on account of the many singular blessings it received from the Divine Providence, and partly on account of its metropolis being made the centre of God's worship and his peculiar habitation; but much more for its being the place of our Saviour's birth, the scene of his preaching and manifold miracles; especially the place in which he accomplished the great work of our redemption. As to the name of Judæa, it did not

begin to receive that till after the return of the Jews from the Babylonish captivity, though it had been styled long before the Kingdom of Judah, in opposition to that of Israel, which revolted from it under Jeroboam, in the reign of Rehoboam the son of Solomon. But after the return, the tribe of Judah, the only one that made any figure, settling at Jerusalem, and in the countries adjacent, quickly gave its name to the whole territory. By profane authors it was called by many different names; such as Syria, Palestina Syria, Cœlesyria, Iduma, Idumæa, and Phœnicia or Phœnice; but these are supposed only to have been given out of contempt to the Jewish nation, whom they looked upon as unworthy of any other name than what distinguished the most obscure parts of the neigbouring provinces.

That part of the country which was properly called the Land of Promise, was inclosed on the west by the Mediterranean; on the east by the lake Asphaltites, the Jordan, and the sea of Tiberias or of Galilee, and the Samachonite lake; to the north it had the mountains of Libanus, or rather of Antilibanus, or the province of Phœnicia; and to the south, that of Edom or Idumæa, from which it was likewise parted by another ridge of high mountains. The boundaries of the other part, which belonged to the two tribes and an half beyond the river Jordan, are not so easily defined, as well as those of the conquests made by the more prosperous kings of the Jews. All that can be said with any probability is, that the river Arnon was the first northern boundary on that side; and with respect to those on this side the Jordan, there is a considerable disagreement between the Hebrew and Samaritan versions of the Pentateuch.

The extent of this country is likewise variously settled by geographers; some giving it no more than 170 or 180 miles from north to south, and 140 in breadth where broadest, though not much above half that breadth where narrowest. But from the latest and most accurate maps, it appears to extend near 200 miles in length, and about 80 in breadth about the middle, and about 10 or 15, more or less, where it widens or shrinks.

For a minute account of Palestine we cannot do better than refer to Wells's Scripture Geography.

PALESTRINA, one of the largest of the islands called the Lagunes, near Venice. It has a town of the same name, six miles S. of Venice.

PALESTRINA, anciently Præneste, an episcopal town of Italy, in Campagna di Roma, with the title of a principality. Here formerly stood a temple dedicated to Fortune, the ruins of which may yet be seen. It is 25 miles E. by S. of Rome. Lon. 13. 5 E. Lat. 41. 52 N.

PA'LETTE. *s.* (*pallette*, French.) A light board on which a painter holds his colours [illegible] paints (*Tickel*).

PALEY (William), an eminent divine, born at Peterborough, 1743. He was educated under his father who was a clergyman, at Giggleswick school, Yorkshire, and then at Christ's college, Cambridge. He was for three years after assistant at Greenwich school, and then became an active tutor in his college, and had for his coadjutor Dr. Law, afterwards bishop of Elphin. By the kindness of his friend's father, who was bishop of Carlisle, he obtained a living in Cumberland, and next Appleby, in Westmorland, and a prebend in Carlisle cathedral, and the living of Dalston. In 1780 he was made chancellor of Carlisle, and in 1785 he published his Elements of Moral and Political Philosophy, in 4to. a most valuable work, often reprinted, in 2 vols. 8vo. In 1780, he declined the mastership of Jesus college, Cambridge, which the bishop of Ely wished to confer upon him. He was afterwards presented to a prebend at St. Paul's, and to the living of Bishop Wearmouth. He published, in 1790, Horæ Paulinæ, or the truth of the scripture history of St. Paul, &c. 8vo.—a View of the Evidences of Christianity, 3 vols. 8vo. 1794, dedicated to the bishop of Ely—Natural Theology, 8vo. 1802; besides some single sermons. He died at Sunderland, in 1805, aged 62 years. Since his death a volume of posthumous sermons has been published, several of which are very excellent.

The works of this very able author are most highly and deservedly esteemed. His Moral Philosophy is in many respects an admirable work, though the theory of expediency which he adopts is open to many abuses, which have been ably exposed by Mr. Gisborne. The political speculations, if not the most valuable part of his work, are certainly that part in which his talents are most eminently displayed. His observations on the laws and constitution of this kingdom shew that he had imbibed very largely the spirit of our jurisprudence, and are founded upon enlarged views, such as are rarely taken by those who, in the course of their professional studies, make greater legal acquisitions. The chapters in which he discusses the duties and interests of those who govern kingdoms are no less worthy of attention; and in the latter part of the volume he investigates the causes of national prosperity, and the means by which they may be rendered most efficacious, with a degree of skill and originality which may justly intitle him to be ranked among the greatest masters of the science of political economy. The political writings of Dr. Paley have been studied and admired by the most illustrious statesmen of the present times. It would be useless to enumerate the praises with which they have been honoured; but the last and perhaps the most enviable that were bestowed on them were connected with circumstances so peculiar as to be deserving of mention. In the debate on the catholic question twelve days before his death, Mr. Fox in the House of Commons read two passages from his work which contained the leading ideas of the celebrated speech delivered on that occasion. Both of these Mr. Fox prefaced with very high compliments, and when speaking of the first said, that the author, though living,

ought not to be defrauded of his due praise, and that he therefore would not conceal his name. This expression was imperfectly understood by most of the reporters, who in their accounts of the debate represented Mr. Fox as describing him to be not living, and spread about the kingdom false intelligence that he was dead just when he was labouring under the illness which was the cause of his death.

Dr. Paley's View of the Evidences of Christianity is justly esteemed the most decisive work which has ever been published on the subject. His Horæ Paulinæ is not the most popular of his works, though it perhaps is that which is most admired by his judicious readers for the originality of the design and the vigour of the execution. It is an exposition and consideration of the evidences of the truth of the christian religion, which may be derived from the conversion and ministry of St. Paul, and especially from the numerous obviously undesigned coincidences between Paul's Epistles and the history of the Acts of the Apostles, written by Luke. Dr. Paley professes to have chosen the subject of his work on Natural Theology, because, with those he had already treated of, it formed a system which was complete, though its parts had been produced in an inverted order. In his Natural Theology, Horæ Paulinæ, and Evidences of Christianity, he proved the truth of religion, natural and revealed; and in his Moral and Political Philosophy taught the duties which result from and are sanctioned by the proof. He had undoubtedly another reason for the choice of this subject, that it was eminently adapted to his talents. To reason perspicuously and illustrate happily, were the powers by which he was most distinguished, and what other subject offered such admirable materials to exercise them? He has traced and shewn the marks of wisdom and design in various parts of the creation, but has dwelt principally on those which may be discovered in the constitution of the human body. The book contains almost a complete treatise of anatomy, which, by the observations he has interspersed, and by the excellence of his descriptions, he has contrived to render interesting even to those who read without any previous knowledge of the science. To be secure of immortality an author must be recommended either by striking excellencies of language or of sentiment, or by an happy arrangement of the parts of his subject, which renders them necessary to each other and incapable of separation. Valuable matter cannot alone preserve the name of the author, for of that he may be plundered by the writers of a succeeding age, who being able to consult its taste, will necessarily be more popular than an ancient whose productions have not some intrinsic superiority. Dr. Paley is not remarkable for elegant periods or splendid sentiments. He seems to have been less ambitious of pleasing the ear than of informing the understanding; for if we except the dedication of the Moral and Political Philosophy, some chapters in the same work (particularly that On reverencing the Deity), and the conclusion of the Natural Theology, which contain some of the most elegant and dignified passages to be found in the language; the general characteristic of his writings is plainness and simplicity. But this is the genuine didactic style, and he has imparted to it all those numerous graces of which it is capable. It will be universally allowed that no author ever wrote so pleasingly on the subjects he has treated of. The force and terseness of his expressions is not less admirable than the strength of his conceptions, and there is both in his language and his ideas a peculiarity of manner stamped by the vigour and independence of his mind, which cannot be borrowed, and which will therefore perpetuate his reputation. He has merit to deserve readers, and allurements to attract them, and will preserve a high rank among those writers of his country, who can command the attention of posterity. He is one of the best writers of what may be called the English matter of fact style, that ever lived.

During the greater part of Dr. Paley's life he was a most decided Socinian; during the last three or four years, however, he seems to have examined doctrinal points with great attention: and the consequence was, as might naturally be expected, a total change in many of his sentiments. Several of his posthumous sermons are quite evangelical in sentiment; and if they are not all so, it has happened, we conjecture, from the gradual change in his views during the latter part of his life, and his inability during his last illness to give those sermons such a revisal as he would have done, had he intended their publication.

PALFREY, is one of the better sort of horses used by noblemen or others for state; and sometimes of old taken for a horse fit for a woman to ride. Camden says, that William Fauconberge held the manor of Cukeny, in the county of Nottingham, in sergeantry, by the service of shoeing the king's palfrey when the king should come to Mansfield.

PA'LFREYED. *a.* (from *palfrey*.) Riding on a palfrey (*Tickel*).

PALICAUT, a fort of Hindustan, in Malabar, built by Hyder, on his conquest of that province. Around it are scattered many villages, which contain a considerable population and have some trade. It stands between two rivulets, near their junction, at the foot of the southern extremity of the Gauts, 25 miles W.S.W. of Coimbetore, and 56 E. by N. of Paniany.

PALIFICA'TION. *s.* (*palus*, Lat.). The act or practice of making ground firm with piles (*Wotton*).

PALICI, or PALISCI, two deities, sons of Jupiter by Thalia, whom Æchylus calls Ætna, in a tragedy now lost. According to Macrobius, Ætna, when pregnant, entreated Jupiter to remove her from the pursuits of Juno. The god concealed her in the bowels of the earth, and when the time of her delivery was come, the earth opened and brought into the world two children, who received the name of Palici,

quasi, ἀπο του παλιν ικεσθαι, because they came again into the world from the bowels of the earth. These deities were worshipped with great ceremonies by the Sicilians.

PALILIA, a festival celebrated by the Romans, in honour of the goddess Pales. The ceremony consisted in burning heaps of straw, and in leaping over them. The purification of the flocks was made with the smoke of sulphur, of the olive, the pine, the laurel, and the rosemary. Offerings of mild cheese, boiled wine, and cakes of millet were afterwards made to the goddess. This festival was observed on the 21st of April. Some call this festival Parilia *quasi a pariendo*, because the sacrifices were offered to the divinity for the fecundity of the flocks.

PALIMBAN, the capital of a kingdom of the same name, on the S.E. coast of the island of Sumatra. The Dutch have a fort here, and purchase large quantities of pepper. It stands on the river Palimban, about 50 miles from the sea, and 130 N.E. of Bencoolen. Lon. 103. 45 E. Lat. 2. 56 S.

PALINDROMUS, a verse or sentence which runs the same when read either backwards or forwards. Such is the verse, *Roma tibi subito motibus ibit amor*. Some people of leisure have refined upon the palindromus, and composed verses, each word of which is the same backwards as forwards; for instance, that of Camden:

Odo tenet mulum, madidam mappam tenet Anna.
Anna tenet mappam, madidam mulum tenet Odo.

PALINGENESIA, among divines, the same with regeneration. Among chemists, it denotes the producing of a body from its principles.

PALINGENIUS (Marcellus), an Italian poet of the 16th century, born in Ferrara. He wrote and dedicated to his patron Hercules II. duke of Ferrara, his poem in 12 books, called Zodiacus Vitæ; but he spoke with such freedom of the popish clergy, that not only the book was prohibited, but the body of the author was ordered to be dug up and burnt, which was, however, prevented by the duchess of Ferrara.

PALINODE, PA'LINODY. *s.* (παλινωδια.) A recantation (*Sandys*).

PALINURUS, in fabulous history, a skilful pilot of the ship of Æneas. He fell into the sea in his sleep, and was three days exposed to the tempests and agitation of the sea, and at last came safe to the sea shore, where the cruel inhabitants of the place murdered him. Æneas, when he visited the infernal regions, saw Palinurus, and assured him, that though his bones were deprived of a funeral, yet the place where his body was exposed should soon be adorned with a monument, and bear his name, and accordingly a promontory was called Palinurus.

PALISADES, in fortification, stakes made of strong split wood, about nine feet long, six or seven inches square, three feet deep in the ground, in rows about two and a half or three inches asunder, placed in the covert way, at three feet from, and parallel to the parapet or side of the glacis, to secure it from surprise. They are also used to fortify the avenues of open forts, gorges, half moons, the bottoms of ditches, and in general all posts liable to surprise. They are usually fixed perpendicularly, though some make an angle inclining towards the ground next the enemy, that the ropes cast over them to tear them up may slip off.

To PALISA'DE. *v. a.* (from the noun.) To enclose with palisades.

PA'LISH. *a.* Somewhat pale.

PALK STRAIT, a strait at the north end of the island of Ceylon, in the bay of Bengal, which separates that island from the coast of Tanjore in Hindustan. It is celebrated for the extensive pearl fishery which is carried on in it, on both shores, lately by the Dutch, and now by the English.

PALL, *s.* (*pallium*, Latin.) 1. A cloak or mantle of state (*Milton*). 2. The mantle of an archbishop (*Ayliffe*). 3. The covering thrown over the dead (*Dryden*).

To PALL. *v. a.* (from the noun.) To cloak; to invest (*Shakspeare*).

To PALL. *v. n.* (perhaps a corruption of *pale*.) To grow vapid; to become insipid (*Addison*).

To PALL. *v. a.* 1. To make insipid or vapid (*Atterbury*). 2. To make spiritless; to dispirit (*Dryden*). 3. To weaken; to impair (*Shakspeare*). 4. To cloy (*Tatler*).

PALL, in heraldry, a figure like a Greek Υ, about the breadth of a pallet; it is by some heralds called a cross-pall, on account of its being looked upon as an archiepiscopal bearing.

PALLA, in Roman antiquity, a mantle which women wore over the gown called *stola*. It was borne on the left shoulder; whence passing to the other side, under the right arm, the two ends were bound under the left arm, leaving the breast and arm quite bare. It had a great many folds, and derived its name from παλλω, to shake or tremble.

PALLADIO (Andrew), an Italian architect, born at Vicenza, in Lombardy. He was early instructed in architecture, and by visiting Rome he viewed and studied the venerable relics of ancient times. He made very beautiful drawings of these precious monuments, and published them with commentaries, and afterwards gave to the world his four books of architecture, in 1570, a work translated into French, and also into English, and commented upon by Inigo Jones. His most magnificent edifice is the theatre called Degli Olympici at Vicenza. He died 1580.

PALLADIUM, a celebrated statue of Pallas, representing the goddess as sitting and holding a pike in her right hand, and in her left a distaff and a spindle. It is said it fell down from heaven near the tent of Ilus, as that prince was building the citadel of Ilium. Others give it a different origin, but however discordant their opinions be about this famous

statue, it is universally agreed, that on its preservation depended the safety of Troy. This fatality was well known to the Greeks during the Trojan war, and therefore Ulysses and Diomedes were commissioned to steal it away, which they effected, by, it is asserted, the assistance of Helenus the son of Priam, who proved in this unfaithful to his country. Minerva was displeased with the violence offered to her statue, and according to Virgil the Palladium itself appeared to have received life, and by the flashes from its eyes, and sudden springs from the earth, indicated the resentment of the goddess. Some affirm, that the true Palladium was not taken by Ulysses and Diomedes, but that Æneas carried it with him into Italy.

Palladium, a metal obtained from the ore of platina. See Platinum.

PALLANTIDES, the fifty sons of Pallas, the brother of Ægeus. They were all killed by Theseus, the son of Ægeus, whom they opposed when he came to take possession of his father's kingdom.

PALLAS, a freed man of Claudius, famous for his power and riches. He advised the emperor to marry Agrippina, and to adopt her son Nero. It was by his means, and those of Agrippina, that the death of Claudius was hastened, and that Nero was raised to the throne. Nero afterwards discarded Pallas, and some time after caused him to be put to death, that he might make himself master of his great riches, A.D. 61.

Pallas (*adis*), the same as Minerva. She received this name either because she killed the giant Pallas, or from the spear which she seems to brandish in her hands, (παλλειν). See Minerva.

Pallas (*antis*), a son of king Evander, sent with some troops to assist Æneas. He was killed by Turnus, the king of the Rutuli, after he had made a great slaughter of the enemy. (*Virgil*). One of the giants, son of Tartarus and Terra. He was killed by Minerva.

PALLASIA, in botany, a genus of the class syngenesia, order polygamia frustranea. Receptacle chaffy, downless; seeds vertical; flat, with a ciliate margin, calyx imbricate. Two species; Mexican plants.

PALLAVICINI (Anthony), a native of Genoa. His abilities recommended him to the pope, who employed him in several embassies, and made him bishop of Pampeluna, and a cardinal. He died 1507, aged 66.

Pallavicini (Ferrant), an eccentric Italian, born at Placentia. He assumed the habit of an Augustine friar; but instead of a regular life, he devoted himself to the amours of courtezans. Poor by his incontinence, he had recourse to his pen for support, and wrote his Courier robbed of his Mail, a periodical work, which for a while was read with avidity; but soon, from its satirical nature, was noticed by the inquisition. He avoided persecution by travelling into Germany; but upon his return to Venice he resumed his Courier, and in greater violence vented his satire even against the pope. He was seized, but made his escape by means of one of his mistresses; and he might have avoided the impending storm, had not Morfu, a creature of the pope's nuncio, prevailed on him to go to France, in hopes of meeting encouragement from Richlieu. Pallavicini was caught in the snare; but instead of being conducted to Paris, he was brought to Avignon, where after some severe and inhuman treatment he was brought to trial and condemned to lose his head, which took place at Avigon, 1644. Morfu, who had been rewarded for his villainy, was afterwards murdered by one of Pallavicini's friends. He wrote some books of merit, printed at Venice, 4 vols. 12mo. 1655.

Pallavicini (Sforze), a cardinal, born at Rome, 1607. He entered among the jesuits, and taught philosophy and theology, and gained the respect of the world. He was made a cardinal, and died 1667, aged 60. He wrote an Italian treatise on style, and on dialogue—some letters—but his best known work is the History of the Council of Trent, in opposition to that of father Paul.

PALLENE, a small peninsula of Macedonia, formerly called Phlegra, situate above the bay of Thermæ on the Ægean sea, and containing five cities, the principal of which is called Pallene. It was in this place, according to some of the ancients, that an engagement happened between the gods and the giants.—2. A village of Attica, where Minerva had a temple, and where the Pallantides chiefly resided.

PA'LLET. *s.* (from *paille*, Fr. straw.) 1. A small bed; a mean bed (*Wotton*). 2. (*palette*, Fr.) A small measure of liquid, formerly used by chirurgeons (*Hakewill*).

Pallet, among painters. See Palette.

Pallet, in gilding, an instrument made of a squirrel's tail, to take up the gold leaves from the pillow, and to apply and extend them on the matter to be gilt. See Gilding.

Pallet, in heraldry, is nothing but a small pale consisting of one half of it in breadth, and therefore there are sometimes several of them upon one shield.

Pallet is also a part belonging to the balance of a watch or movement. See the article Watch.

PA'LLIAMENT. *s.* (*pallium*, Lat.) A dress; a robe (*Shakspeare*).

PA'LLIARDISE. *s.* (*palliardise*, Fr.) Fornication; whoring: obsolete.

To PA'LLIATE. *v. a.* (*pallio*, Lat. *pallier*, Fr.) 1. To cover with excuse (*Swift*). 2. To extenuate; to soften by favourable representations (*Dryden*). 3. To cure imperfectly or temporarily, not radically; to ease, not cure.

PALLIA'TION. *s.* (*palliation*, French.) 1. Extenuation; alleviation; favourable representation (*King Charles*). 2. Imperfect or temporary, not radical cure; mitigation, not cure (*Bacon*).

PA'LLIATIVE. *a.* (*palliatif*, Fr.) 1. Extenuating; favourably representative. 2. Mitigating, not removing; temporarily, not radically curative (*Arbuthnot*).

PA'LLIATIVE. *s.* (from *palliate.*) Something mitigating (*Swift*).

PA'LLID. *a.* (*pallidus*, Latin.) Pale; not high coloured; not bright (*Spenser*).

PALLIO COOPERIRE. It was an ancient custom, where children were born out of lawful wedlock, and their parents were afterwards married, that those children, together with the father and mother, should stand *pallio cooperti*, under a cloth, while the marriage was solemnizing; which was a kind of adoption, and had the effect of a legitimation. Thus Robert Grosthead, the famous bishop of Lincoln, in one of his letters, says: *In signum legitimationis, nati ante matrimonium consueverunt puni sub* pallio *super parentes eorum extento, in matrimonii solemnizatione.* Selden, in his notes on Fleta, adds, that the children of John of Gaunt, duke of Lancaster, by Catharine Swinford, though legitimated by act of parliament, yet were covered with the pall when their parents were married.

PALLISER ISLANDS, a group of islands in the Pacific ocean; the largest about 15 miles long and 10 broad. Lon. 146. 30 W. Lat. 15. 38 S.

PALLIUM, in antiquity, an upper garment or mantle worn by the Greeks, as the toga was by the Romans. Each of these were so peculiar to the respective nations, that Palliatus is used to signify a Greek, and Togatus a Roman.

PALLMA'LL. *s.* (*pila*, and *malleus*, Latin; *pale maille*, French.) A play in which the ball is struck with a mallet through an iron ring.

PALM. *s.* (*palma*, Latin.) 1. A tree of great variety of species; of which the branches were worn in token of victory: it therefore implies superiority (*Miller*). 2. Victory; triumph (*Dryden*). 3. The inner part of the hand (*Bacon*). 4. A hand, or measure of length, comprising three inches (*Denham*).

To PALM. *v. a.* (from the noun.) 1. To conceal in the palm of the hand, as jugglers (*Prior*). 2. To impose by fraud (*Dryden*). 3. To handle (*Prior*). 4. To stroak with the hand (*Ainsworth*).

PALM TREE. See CHEMŒROPS.

PALM TREE (Dwarf). See CHEMŒROPS.

PALM (Cocoa-nut). See COCOS.

PALM (Frausal nut). See ARECA.

PALM (Mountain fan). See CORYPHA.

PALM SUNDAY, the Sunday next before Easter, being so called in memory of our Saviour's triumphant entry into Jerusalem, when the attending multitude strewed branches in his way.

PALM OIL. (*oleum palmæ.*) This oil is produced chiefly from the fruit of the cocos butyracea inermis, frondibus pennatis: foliolis simplicibus of Linnéus, by bruising and dissolving the kernels of the fruit in water, without the aid of heat, by which the oil is separated, and rises to the surface, and on being washed two or three times is rendered fit for use. When brought into this country it is of the consistence of an ointment, and of an orange yellow colour, with little taste, and of a strong, though not disagreeable, smell. Its use is confined to external applications in pains, tumours, and sprains; but it appears to possess very little, if any, advantage over other bland oils. See OIL.

PALMA, one of the Canary islands, to the N. of Ferro, 50 miles in circumference, and very fertile. It has a town of the same name, much frequented for its excellent wines, and safe harbour. Lon. 17. 50 W. Lat. 28. 37 N.

PALMA, a town of Spain, in Andalusia, on the Xenil, near its conflux with the Guadalquiver, 30 miles S.W. of Cordova.

PADMA, or PALMA NUOVA, a strong frontier town of Italy, in Friuli, seated on a canal, which communicates with the Lizonzo, 10 miles S.E. of Udina, and 55 N.E. of Venice. Lon. 13. 15 E. Lat. 46. 2 N.

PALMA CHRISTI, in botany. See RICINUS.

PALMÆ, in botany, the sixth family; and the first of the nine great tribes, nations, or casts, into which Linnéus has divided all vegetables. They are placed in the appendix to the Artificial System, and take the lead in the natural orders, though Linnéus had placed them only in the second place, in his Fragments of a Natural Method.

PALMARIS BREVIS. (*palmaris*, from *palma*, the hand.) In myology, a small, thin, cutaneous flexor muscle of the hand, situated on the fore arm, between the wrist and the little finger. Fallopius tells us, that it was discovered by Cananus. Winslow names it palmaris cutaneus. It arises from a small part of the internal annular ligament, and inner edge of the aponeurosis palmaris, and is inserted by small bundles of fleshy fibres into the os pisiforme, and into the skin and fat that cover the abductor minimi digiti. This muscle seems to assist in contracting the palm of the hand.

PALMARIS CUTANEUS. See PALMARIS BREVIS.

PALMARIS LONGUS. Ulnaris gracilis of Winslow. A flexor muscle of the arm situated on the fore arm, immediately under the integuments. It arises tendinous from the inner condyle of the os humeri, but soon becomes fleshy, and after continuing so about three inches, terminates in a long slender tendon, which near the wrist separates into two portions, one of which is inserted into the internal annular ligament, and the other loses itself in a tendinous membrane, that is nearly of a triangular shape, and extends over the palm of the hand, from the carpal ligament to the roots of the fingers, and is called aponeurosis palmaris. Some of the fibres of this expansion adhere strongly to the metacarpal bones, and separate the muscles and tendons of each finger. Several anatomical writers have considered this aponeurosis as a production of the tendon of this muscle, but seemingly without reason, because we now and then find the latter wholly inserted into the carpal ligament, in which case it is perfectly distinct from the

aponeurosis in question; and, in some subjects, the palmaris longus is wanting, but the aponeurosis is always to be found. Rhodius indeed says that the latter is now and then deficient, but there is good reason to think that he was mistaken. This muscle bends the hand, and may assist in its pronation; it likewise serves to stretch the aponeurosis palmaris.

PALMAS, a river of Mexico, formed by the junction of the Nassas and Sauceda, in New Biscay, and thence flows E. about 200 miles, between the provinces of Panuco and New Leon, into the gulf of Mexico.

PALMAS, the capital of the island of Canaria. See CANARY.

PALMAS, one of the Philippine islands, 16 leagues S.E. of Mindanao. Lon. 127. 0 E. Lat. 5. 33 N.

PALMAS CAPE, a promontory on the Ivory coast of Guinea. Lon. 5. 34 W. Lat. 4. 26 N.

PALMATE, is ornithology, webbed, as the feet of some water-birds.

PALMATE ROOT, in botany, consisting of several oblong tubers or knobs, spreading out like the fingers. As in some sorts of orchis.

PALMATE LEAF. A hand-shaped leaf. Longitudinaliter in partes plures subæquales divisum versus basin, qua tamen cohærent in unum. Philos. Bot.—Divisum ultra dimidium in lobo subæquales. Delin. Pl.—Divided beyond the middle into several lobes that are nearly equal; as in passiflora cærulea. It resembles the hand with the fingers spread; and is one of the simple leaves: whereas the digitate leaf resembles the fingers spread, without the hand; and, having all the leaflets separate, is one of the compound leaves.

PA'LMER. *s.* (from *palm.*) A pilgrim: they who returned from the Holy Land carried branches of palm.

PALMER, in angling. See FISHING FLIES.

PA'LMERWORM. *s.* (*palmer* and *worm.*) A worm covered with hair, a caterpillar.

PALMERSTON ISLE, an island in the Pacific ocean, discovered by Cook, in 1774. It consists of about ten islets, connected by a reef of coral rocks, and lying in a circular direction; the principal one not exceeding a mile in circumference, nor more than three feet above the level of the sea. It abounds with cocoa-nuts, scurvygrass, and the wharra-tree, but has no inhabitants. Lon. 162. 57 W. Lat. 18. 0 S.

PALMETTO, in botany. See CHEMÆROPS.

PALMI'FEROUS. *a.* (*palma* and *fero*, Lat.) Bearing palms.

PA'LMIPEDE. *a.* (*palma* and *pes*, Lat.) Webfooted (*Brown*).

PA'LMISTER. *s.* (from *palma*, Lat.) One who deals in palmistry.

PA'LMISTRY. *s.* (*palma*, Latin.) 1. The cheat of foretelling fortune by the lines of the palm (*Cleaveland*). 2. The action of the hand (*Addison*).

PA'LMY. *a.* (from *palm.*) Bearing palms.

PALMYRA, or TADMOR, once a magnificent city of Syria, originally built by king Solomon, in the midst of a sandy desert, bounded on three sides by a chain of high mountains. On the decline of the Macedonian empire in the east it became the capital of a principality, under the name of Palmyra; and it declared for the Romans on Adrian marching his army through Syria to Egypt. The city flourished and increased to the time of Aurelian, when it resisted the Roman power under queen Zenobia, who held it out a long time, but was at length taken captive, and led in triumph through the streets of Rome. Soon afterward the inhabitants massacred the soldiers who had been left in garrison; which outrage occasioned the return of Aurelius, who, having made himself master of the place, caused all the inhabitants to be destroyed, and gave the pillage of the city to the soldiers. The stupendous ruins of this city were visited in 1751 by Mr. Wood, who published a splendid account of them in 1753. The inhabitants then consisted of about forty families, living in mud cottages, erected within the spacious court of a once magnificent temple. Palmyra is 100 miles S.E. of Aleppo. Lon. 38. 50 E. Lat. 33. 20 N.

PALMYRA ISLAND, an island in the South Sea, discovered by Capt. Sowle in the American ship Palmyra, November 10, 1802. This island is situated in latitude 5° 49′ N. and in longitude 162° 23′ W. from London; it is about three leagues in extent; there are two lagoons on it; in the westermost of which is twenty fathom water, with a fine sandy bottom. It is very dangerous to approach the western part of the island, on account of the coral rocks which are just below the surface of the water, and extend to the distance of three or four leagues from the shore. The eastern part terminates in a steep reef of coral, over which the sea breaks with considerable force. On the north-west side there is good anchoring ground, about three quarters of a mile from the breakers, in eighteen fathom water on a coral bottom. There are no inhabitants on the island; nor was any fresh water found: but cocoa nuts, of very large size, are in great abundance; and fish of various kinds, and in large shoals, surrounded the land. A great quantity of drift-wood lay on the beach, which enabled those who landed to ascertain that the rise of the tide was about eighteen inches. (*Monthly Magazine, Nov.* 1804.)

PALNAUD, a district of Hindustan, belonging to the Carnatic, situate between the river Kistna, and to the W. of the Guntoor circar. Timerycotta is the principal place.

PALOS, a seaport of Spain, in Andalusia, with a tolerable harbour; celebrated for being the place whence Columbus sailed on his first adventurous voyage in 1492. It is seated at the mouth of the Tinto, 50 miles W. by S. of Seville. Lon. 6. 52 W. Lat. 37. 10 N.

PALPABI'LITY. *s.* (from *palpable.*) Quality of being perceivable to the touch (*Pope*).

PA'LPABLE. *a.* (*palpable*, French.) 1.

Perceptible by the touch (*Milton*). 2. Gross; coarse; easily detected (*Tillotson*). 3. Plain; easily preceptible (*Hooker*).

PA'LPABLENESS. *s.* (from *palpable.*) Quality of being palpable; plainness; grossness.

PA'LPABLY. *ad.* (from *palpable.*) 1. In such a manner as to be perceived by the touch. 2. Grossly; plainly (*Bacon*).

PALPA'TION. *s.* (*palpatio, palpor,* Lat.) The act of feeling.

To PA'LPITATE. *v. a.* (*palpito,* Latin.) To beat as the heart; to flutter.

PALPEBRÆ. (*pulbebra.*) In anatomy. The eyelids, distinguished into upper and under: at each end they unite and form the canthus.

PALPEBRÆ SUPERIORIS LEVATOR. In myology. See LEVATOR PALPEBRÆ SUPERIORIS.

PALPEBRUM APERIENS RECTUS. See LEVATOR PALPEBRÆ SUPERIORIS.

PALPITATION. (*palpitatio.*) In medicine. Palpitation of the heart, which is either constant or frequently returning. A genus of disease in the class neuroses, and order spasmi of Cullen.

PA'LSGRAVE. *s.* (*paltsgraff,* German.) A count or earl who has the overseeing of a palace.

PA'LSICAL. *a.* (from *palsy.*) Afflicted with a palsy; paralytic.

PA'LSIED. *a.* (from *palsy.*) Diseased with a palsy (*Decay of Piety*).

PALSY. See HEMIPLEGIA, PARAPLEGIA, PARALYSIS, &c.

PALTE, a famous lake of Thibet, lying to the S. of Lassa, about three days journey, and 12 miles S. of the river Sanpoo or Burrampooter. It is 150 miles in circumference; and in the middle of it is one large island. On the W. shore of this island, or congeries of islands, is a monastery, and the seat of the Lamissa Turcepamo, or the Great Regenerate, in whom the Thibetians think that a divine spirit is regenerated, as it is in the Great Lama. The word Lama signifies a priest, and Lamissa is the feminine of Lama.

To PA'LTER *v. n.* (from *paltron, Skinner.*) To shift; to dodge: not in use (*Shakspeare*).

To PA'LTER. *v. a.* To squander: as, *he palters his fortune* (*Ainsworth*).

PA'LTERER. *s.* (from *palter.*) An insincere dealer; a shifter.

PA'LTRINESS. *s.* (from *paltry.*) The state of being paltry.

PA'LTRY. *a.* (*poltron,* French, a scoundrel.) Sorry; worthless; despicable; contemptible; mean (*Addison*).

PALUS MÆOTIS, the ancient name of a gulph between Europe and Asia, to the north of the Black Sea, now called the sea of Zabach, or Asoph.

PALY, or PALE, in heraldry, is when the shield is divided into four or more equal parts, by perpendicular lines falling from the top to the bottom.

PALY BENDE, is when the escutcheon is divided by perpendicular lines, which is paly; and also by diagonals, which is called bendy.

PAM, the knave of clubs.

PAMIERS, a town of France, in the department of Arriege, with a bishop's see. It is not so considerable as formerly, nor peopled in proportion to its extent. Near it is a mineral spring, said to cure the gout and obstructions. Pamiers is seated on the Arriege, eight miles N. of Foix, and 39 S. of Toulouse. Lon. 1. 32 E. Lat. 43. 8 N.

PAMLICO SOUND, a kind of inland sea of N. Carolina, 100 miles long and from 10 to 20 broad. It is separated, in its whole length, from the Atlantic, by a beach of sand, hardly a mile wide, generally covered by small trees or bushes. It has several inlets; but that of Ocrecock is the only one that will admit vessels of burden. This inlet is in lon. 76. 20 W. lat. 35. 10 N.

PAMPELONNE, a town of France, in the department of Tarn, 15 miles N. by E. of Alby. Lon. 2. 17 E. Lat. 44. 10 N.

PAMPELUNA, a town of Spain, capital of Upper Navarre, with a strong citadel, and a rich bishopric. Its squares are handsome, and adorned with shops full of rich merchandise. It is seated on the Arga, 42 miles S. of Bayonne, and 167 N.E. of Madrid. Lon. 1. 35 W. Lat. 42. 47 N.

PAMPELUNA, a town of New Granada, famous for its mines of gold, and numerous flocks of sheep. It is 150 miles N. by E. of St. Fé de Bagota. Lon. 71. 30 W. Lat. 6. 30 N.

To PA'MPER. *v. a.* (*pambere,* Italian.) To glut; to fill with food; to saginate (*Pope*).

PAMPHILUS, a celebrated painter of Macedonia, in the age of Philip. He was founder of the school for painting at Sicyon. Apelles was one of his pupils.

PAMPHYLIA, a province of Asia Minor, anciently called Mopsopia, and bounded on the south by a part of the Mediterranean, called the Pamphylian sea, west by Lycia, north by Pisidia, and east by Cilicia. It abounded with pastures, vines, and olives.

PA'MPHLET. *s.* (*par un filet,* French.) A small book; properly a book sold unbound, and only stitched (*Clarendon*).

To PA'MPHLET. *v. n.* (from the noun.) To write small books (*Howel*).

PAMPHLETE'ER. *s.* (from *pamphlet.*) A scribbler of small books (*Swift*).

To PAN. *v. a.* An old word denoting to close or join together (*Ainsworth*).

PAN. *s.* (ponne, Saxon.) 1. A vessel broad and shallow (*Spenser*). 2. The part of the lock of the gun that holds the powder (*Boyle*). 3. Any thing hollow: as, the brain *pan*.

PAN, in ancient mythology, was the god of shepherds, of huntsmen, and of all the inhabitants of the country. He was the son of Mercury, by Dryope, according to Homer. Different authors have given him different parents. Pan, however, was a monster in appearance; he had two small horns on his head, his complexion was ruddy, his nose flat, and his legs,

thighs, tail, and feet, were those of a goat. His education was entrusted to a nymph of Arcadia, called Sinoe, but the nurse, according to Homer, terrified at the monster, fled away and left him. He was wrapped up in the skins of beasts by his father, and carried to heaven, where Jupiter and the gods long entertained themselves with the oddity of his appearance. There Bacchus gave him the name of Pan. The god of shepherds chiefly resided in Arcadia, where the woods and the most rugged mountains were his habitation. He invented the flute with seven reeds, which he called Syrinx, in honour of a nymph of the same name who was changed into a reed. He was continually employed in deceiving the neighbouring nymphs, and captivated Diana, by transforming himself into a beautiful white goat. He was also enamoured of a nymph of the mountains called Echo, by whom he had a son called Lynx. He also paid his addresses to Omphale, queen of Lydia. The worship of Pan was well established, particularly in Arcadia, where he gave oracles on mount Lycæus. His festivals, called by the Greeks Lycæa, were brought to Italy by Evander, and they were well known at Rome by the name of the Lupercalia. (See LUPERCALIA.) The worship, and the different functions of Pan, are derived from the mythology of the ancient Egyptians. As Pan usually terrified the inhabitants of the neighbouring country, that kind of fear which often seizes men, and which i only imaginary, has received from him the name of *panic fear*.

PAN, or PAHANG, a town on the E. coast of the peninsula of Malacca. It is the capital of a kingdom of the same name, remarkable for the great number of elephants, and for the plenty of pepper it produces. Pan is 140 miles N.E. of Malacca. Lon. 103. 20 E. Lat. 3. 55 N.

PANACEA. (*panacea*, πανακεια; from παν, all, and ακιομαι, to make well.) An epithet given by the ancients to those remedies which they conceived would cure every disease. Unfortunately for those of the present day, there are no such remedies.

Some derive the name from Panacea, a daughter of Æsculapius who presided over health.

PANADA. (*pane*, bread, Ital.). Bread boiled in water to a proper consistence for feeding children or infirm persons with.

PANÆTIUS, a stoic philosopher of Rhodes, 138 B. C. He studied at Athens for some time, thence he came to Rome, where he reckoned among his pupils Lælius and Scipio, the second Africanus.. To the latter he was attached by the closest ties of friendship and familiarity: he attended him in his expeditions, and partook of all his pleasures and amusements. Panætius wrote a treatise on the duties of man, whose merit can be ascertained from the encomiums which Cicero bestows upon it.

PANAGIA, a town of Turkey in Europe, in Romania, 14 miles N. of Gallipoli. Lon. 27. 2 E. Lat. 40. 40 N.

PANAMA, the capital of Terra Firma Proper, and the seat of a royal audience and of a bishop. It was built in 1517, and was sacked and burnt by the English buccaneers in 1670. Before the abolition of the trade by the galeons, in 1748, the Spaniards of Chili and Peru, in order to be supplied with the products and manufactures of Europe, were obliged to repair to Porto Bello or Panama; but, since that period, the commercial intercourse has been carried on by single vessels, called register ships, which sail round Cape Horn, and convey directly to the ports of Chili and Peru the merchandise which was formerly conveyed across the isthmus of Darien to Panama. In the harbour of Panama is a fine pearl fishery. This city is seated on a bay of the same name, 70 miles S. of Porto Bello. Lon. 80. 35 W. Lat. 8. 48 N.

PANARIA, one of the Lipari islands, in the Mediterranean, between Lipari and Stromboli. It is barren, and only five miles in circumference.

PANARIS. (*panaris*, corrupted from *paronychia*). See PARONYCHIA.

PANARMONION. (Greek.) A wind instrument used by the ancient Greeks, which (as far as we are able to collect from Plato, and the Commentaries of Proclus on that illustrious author), consisted of an assemblage of pipes, and resembled in some degree the modern organ. It is particularly worthy of notice, that every hole of these pipes, or imitation of pipes, as Proclus expressly calls them, was capable of emitting three different sounds, and in some circumstances more than three: from which we conclude that the ancients were better acquainted with the theory of natural harmonics than is generally supposed; several even of the moderns denying the possibility of the thing altogether. See OCTAVE.

PANATHENÆA, festivals in honour of Minerva the patroness of Athens, first instituted by Erichtheus or Orpheus, and called Athenæa; but Theseus afterwards renewed them, and caused them to be celebrated and observed by all the tribes of Athens, which he had united into one, and from which reason the festivals received their name. Some suppose that they are the same as the Roman Quinquatria, as they are often called by that name among the Latins. In the first years of the institution they were observed only during one day, but afterwards the time was prolonged, and the celebration was attended with greater pomp and solemnity. The festivals were two; the great Panathenæa or μεγαλα, observed every 5th year, and the lesser Panathenæa, μικρα, which were kept every 3d year, or rather annually. For a minute description of the manner of their celebration, the student is referred to Lempriere's larger dictionary, or Potter's Antiquities.

PANAX. Ginseng. In botany, a genus of the class polygamia, order dioecia. Herm.

umbel. Calyx five-toothed, superior; corol five-petalled; stamens five; styles two; berry two-seeded. Male: umbel. Calyx entire. Nine species; natives of America, China, and Australasia.

The cultivated species are as follows:

1. P. quinquefolia. Proper ginseng.
2. P. trifolia. Three-leaved panax.
3. P. aculeata. Prickly panax.

The first two sorts are increased by sewing the seeds on a hot-bed; the last by layers or cuttings.

Ginseng was formerly supposed to be confined to the mountains of Chinese Tartary: it is now, however, fully ascertained that the American panax quinquefolia is precisely the same.

The dried imported roots scarcely exceed the thickness of the little finger; are about three or four inches long, frequently forked, transversely wrinkled, of a horny texture, and both internally and externally of a yellowish-white colour. "To the taste it discovers a mucilaginous sweetness, approaching to that of liquorice, accompanied with some degree of bitterness, and a slight aromatic warmth, with little or no smell. It is far sweeter, and of a more grateful smell than the roots of fennel, to which it has by some been supposed similar; and it differs likewise remarkably from those roots in the nature and pharmaceutic properties of its active principles, the sweet matter of the ginseng being preserved entire in the watry as well as the spirituous extract; whereas that of fennel roots is destroyed or dissipated in the inspissation of the watry tincture. The slight aromatic impregnation of the ginseng is likewise, in good measure, retained in the watry extract, and perfectly in the spirituous."

By the Chinese it is regarded altogether as a panacea, or universal medicine: in Europe its medical virtues are regarded as trivial.

PANAY, one of the Philippine islands, between those of Paragoa and Negro. It is 250 miles in circumference, and the most populous and fertile of them all. It is watered by a great number of rivers and brooks, and produces a great quantity of rice. Iloila is the capital.

PA'NCAKE. *s.* (*pan* and *cake.*) Thin pudding baked in a fryingpan (*Mortimer*).

PANCARPUS, in Roman antiquity, a kind of show which the Roman emperors frequently exhibited to the people. The word is formed from the Greek παν, all, and καρπος, fruit. Whence the name was also given by the Athenians to a sacrifice wherein all kinds of fruits were offered. In this spectacle, the Circus, being all set over with large trees, represented a forest, into which the beasts being let from the dens under-ground, the people, at a sign given by the emperor, pursued, shot, and killed all they could lay hold of, which they afterwards carried away, to regale upon at home.

PANCRAS (St.), a village in Middlesex, now adjoining the N.W. of London. It has a church dedicated to St. Pancras; and the churchyard is remarkable for having been the principal place of interment for the Roman catholics. At a public house near the church is a medicinal spring. Here is the Veterinary College, established in 1791, for the improvement of farriery, and the treatment of cattle in general.

PANCRATICAL. *a.* (παν and κρατος.) Excelling in all the gymnastic exercises (*Brown*).

PANCRATIUM (compounded of παν, all, and κρατιω, I overcome), among the ancients, a kind of intermixed exercise, consisting of the lucta or wrestling, and the boxing or pugilate: but it differs in this, that as the athletæ are not to seize the body, their hands are not armed with gauntlets, and give less dangerous blows. The pancratium was the third gymnastic exercise, and was not introduced till long after the others.

PANCRATIUM. Lily daffodil. Sea daffodil. In botany, a genus of the class hexandria, order monogynia. Corol superior, six-petalled; nectary campanulate, twelve-cleft; stamens placed on the nectary; stigma obtuse. Eleven species, natives of the West Indies or South America, a few of the south of Europe. Seven or eight of these are cultivated, the most of them as stove-plants.

PANCREAS. (*pancreas*, πανκρεας; from παν, all, and κρεας, flesh; so called from its fleshy consistence.) A glandular viscus of the abdomen, of a long figure, compared to a dog's tongue, situated in the epigastric region under the stomach. It is composed of innumerable small glands, the excretory ducts of which unite and form one duct, called the pancreatic duct, which perforates the duodenum with the ductus communis choledochus, and conveys a fluid, in its nature similar to saliva, into the intestines. The pancreatic artery is a branch of the splenic. The veins evacuate themselves into the splenic vein. Its nerves are from the par vagum and great intercostal. The use of the pancreas is to secrete the pancreatic juice, which is to be mixed with the chyle in the duodenum. The quantity of the fluid secreted is uncertain; but it must be very considerable, if we compare it with the weight of the saliva, the pancreas being three times larger, and seated in a warmer place. It is expelled by the force of the circulating blood, and of the incumbent viscera in the full abdomen; as the liver, stomach, spleen, mesenteric and splenic arteries, and the aorta. Its great utility appears from its constancy, being found in almost all animals; nor is it refuted by the few experiments in which a part of it was cut out from a robust animal, without occasioning death; because the whole pancreas cannot be removed without the duodenum: for even a part of the lungs may be cut out without producing death, but they are not therefore useless. It seems principally to dilute the viscid cystic bile, to mitigate its acrimony, and to mix it with the food. Hence it is poured into a place remote from the cystic duct, as often as there is no gall-

bladder. Like the rest of the intestinal humours, it dilutes and resolves the mass of aliments, and performs every other office of the saliva.

PANCREATIC DUCT. See DUCTUS PANCREATICUS.

PANDANUS. Screw pine. In botany, a genus of the class diœcia, order monandria. Male: anthers sessile, inserted into the ramifications of the spadix. Female: stigmas two; fruit compound.

One species only, P. odoratissimus, sweet-scented screw pine: a native of Asia.—Branches issuing from large fusiform roots, descending to the ground and dividing; leaves clasping, imbricate in three spiral rows, spinous on the back and edges. It flowers in Asia during the rainy season, and is chiefly employed in making hedges. The perfume afforded by the tender white petals, of the male chiefly, afford the richest and most delightful fragrance of the vegetable world.

As a stove plant, it has a fine ornamental effect in our own country from its large spreading foliage. It may be best propagated by seeds sown in light earth in pots plunged into a tan-bed.

PANDARUS, a son of Lycaon, is remarkable for having broken the truce which had been agreed upon between the Greeks and Trojans. He also wounded Menelaus and Diomedes, and shewed himself uncommonly courageous. He was at last killed by Diomedes; and Æneas, who then carried him in his chariot, by attempting to revenge his death, nearly perished by the hand of the furious enemy.—2. A son of Alcanor, killed with his brother Bitias by Turnus.—3. A native of Crete, punished with death for being accessary to the theft of Tantalus. What this theft was is unknown. Some, however, suppose that Tantalus stole the ambrosia and the nectar from the tables of the gods, to which he had been admitted, or that he carried away a dog which watched Jupiter's temple in Crete, in which crime Pandarus was concerned, and for which he suffered. Pandarus had two daughters. See CAMIRO and CLYTIA.

PANDECTS, PANDECTÆ, in jurisprudence, the digest or collection, made by Justinian's order, of 534 decisions or judgments of the ancient lawyers, on so many questions occurring in the civil law; to which that emperor gave the force and authority of law, by the epistle prefixed to them. The word is Greek, Πανδέκται, compounded of παν, all, and δεχομαι, *capio*, I take; i. e. a compilation, or a book containing all things. Though others, as Bartoli, will have it formed from παν, and δεχομαι; as if these books contained the whole doctrine of the law. The pandects consist of 50 books, and make the first part of the body of the civil law. They were denoted by two ππ; but the copyists taking those ππ for *ff*, the custom arose of quoting them by *ff*.

In the year 1137, the Pandects of Justinian, which had been brought by an Amalsitan merchant from the East, fell into the hands of the Pisans. Angelus Politianus believes this copy to be that which had been complied by order of the emperor. However that be, it is certain that all other copies are taken from it, as being the most ancient. The Pisans having obtained their request from the emperor, carried the volumes to Pisa, and for near three centuries they were known by the name of the Pandectæ Pisanæ.

PANDEMIC. (*pandemicus*; from παν, all, and δημος, the people). A synonym of epidemic. See EPIDEMIC.

PA'NDER. *s.* (from *pandanus*, the pimp in the story of *Troilus* and *Cressida*.) A pimp; a male bawd; a procurer (*Dryden*).

To PA'NDER. *v. a.* (from the noun.) To pimp; to be subservient to lust or passion (*Shakspeare*).

PA'NDERLY. *a.* (from *pander*.) Pimping; pimplike (*Shakspeare*).

PANDICULA'TION. *s.* (*pandiculans*, Latin.) The restlessness, stretching, and uneasiness that usually accompany the cold fits of an intermitting fever (*Floyer*).

PANDION, a king of Athens, son of Erichthon and Pasithea, who succeeded his father, B. C. 1437. He became father of Procne and Philomela, Erechtheus and Butes. During his reign there was such abundance of corn, wine and oil, that it was publicly reported that Bacchus and Minerva had personally visited Attica. He gave his daughter Procne in marriage to Tereus, king of Thrace, who had assisted him in a war with the Bœotians. The treatment which Philomela received from Tereus (see PHILOMELA) was the source of infinite grief to Pandion, and he died after a reign of 40 years.—There was also another Pandion, son of Cecrops 2d, who succeeded his father, B. C. 130. He was driven from his paternal dominions and fled to Pylas, king of Megara, who gave him his daughter Pelia in marriage, and resigned his crown to him. Pandion had four children. Ægeus, the eldest, afterwards recovered his father's kingdom. Some authors have confounded the two Pandions, and made Philomela and Procne the daughters, not of Pandion the 1st, but of Pandion the 2d. (*Ovid. Apollod. Paus.*

PANDORA, the first mortal female that ever lived, according to Hesiod. She was made of clay by Vulcan, at the request of Jupiter, who wished to punish the impiety of Prometheus, by giving him a wife. When this woman of clay had received life, all the gods vied in making her presents. Venus gave her beauty, the Graces the power of captivating, Apollo taught her music, Mercury instructed her in eloquence, and Minerva gave her the most splendid ornaments.—From these presents received from the gods the woman was called Pandora, which intimates that she had received every necessary gift, παν δωρον. Jupiter after this gave her a box to present to the man who married her, and Mercury then conducted her to Prometheus. The artful mortal, sensible of the deceit, would not suffer

himself to be captivated by her charms. His brother Epimetheus was not possessed of the same prudence. He married Pandora, and upon opening the box which she presented him, there issued from it a multitude of evils, which dispersed themselves over the world, and which continue to afflict the human race. Hope only remained at the bottom, which alone renders troubles and sorrows less painful in life.

PANDORON, an ancient stringed instrument resembling a lute, and the strings of which are of brass. Its frets are of copper, like those of the cistrum; its back is like that of a guitar; and the rims of its table, like those of its ribs, are cut into semicircles.

PANDROSOS, a daughter of Cecrops, king of Athens, sister to Aglauros and Herse. She was the only one of the sisters who had not the fatal curiosity to open a basket, in which was Erichthonius, and which Minerva had entrusted to their care: for which sincerity a temple was raised to her, near that of Minerva, and a festival instituted in her honour, called Pandrosia.

PANDURATE LEAF. PANDURAFORM LEAF. In botany. (Pandura, a musical instrument of the guitar kind, in Mersennus) folium. A guitar-shaped leaf. (Viol-shaped, Ray hist. 174.) The French call it *en forme de violon*.—Oblongum, inferne latius, lateribus, coarctatum. Philos. Bot. Oblong, broader, below, contracted on the sides. In Delin. Pl the explanation is differently worded. Oblongum, lateribus: oblongum, lateribus inferne coarctatum. Oblong, contracted below at the sides. The former appears most correct. It is exemplified in rumex pulcher, and convolvulus panduratus.

PANE. *s.* (*paneau*, French.) 1. A square of glass (*Pope*). 2. A piece mixed in variegated works with other pieces (*Donne*).

PANEGYRIC, an oration in praise of some extraordinary thing, person, or virtue. The name is Greek, πανηγυρις; formed of παν, all, and αγυρω, I assemble; because anciently held in public and solemn assemblies of the Greeks, either at their games, their feasts, fairs, or religious meetings. To make their panegyrics the more solemn, the Greeks used to begin with the praises of the deity in whose honour the games, &c. were celebrated; then they descended to the praise of the people or country where they were celebrated; then to the princes or magistrates who presided at them; and at length to the champions, especially the conquerors, who had gained the prizes in them.

PANEGY'RICAL. *a.* 1. Dealing in panegyrics. 2. Communicating or exhibiting panegyrics; laudatory.

PANEGYR'IST. *s.* (*panegyriste*, Fr.) One that writes praise; encomiast (*Camden*).

PA'NEL. *s.* (*panellum*, Lat. *paneau*, Fr.) 1. A square, or piece of any matter inserted between other bodies (*Addison*). 2. A schedule or roll, containing the names of such jurors, as the sheriff provides to pass upon a trial (*Cowell*).

PANG. *s.* (*bang*, Dutch, uneasy.) Extreme pain; sudden paroxysm of torment (*Derham*).

To PANG. *v. a.* (from the noun.) To torment cruelly (*Shakspeare*).

PANGÆUS, in ancient geography, a mountain of Thrace, anciently called Mons Caraminus, and joined to Mount Rhodope, near the sources of the river Nestus. On this mountain Lycurgus, the Thracian king, was torn to pieces, and Orpheus called the attention of the wild beasts and of the mountains and woods to listen to his song.

PANGOLIN, a species of MANIS, which see.

PANJAB, a country of Hindustan Proper, being that watered by the five eastern branches of the Indus. It was the scene of Alexander's last campaign, and the termination of his conquests. It forms a square of 250 miles, and includes the whole of Lahore, and a great part of Moultan Proper. To the lower part of Moultan it is flat and marshy, and inundated by the periodical rains which fall between May and October.

PA'NIC. *s.* Ill grounded terror or fright. See PAN.

PANICLE. In botany. (From *panica*. πανικη, *coma*; or rather from *panus*, the woof about the quill in the shuttle.) Fructificatio sparsa in pedunculis diverse subdivisis. A fructification, or species of inflorescence, in which the flowers or fruits are scattered on peduncles variously subdivided. As in oats and some of the grasses.

PANICLE (Heaped). Having great abundance of flowers.

PANICLE (Dense or close). A higher degree of the preceding. Or rather, having the flowers close as well as abundant.

PANICLE (Spiked). Approaching in form to a spike: as in several of the grasses, which are commonly called spiked grasses.

PANICLE (Contracted). A greater degree of the foregoing.

PANICLE (Coarctate). A squeezed panicle. Having the pedicels extremely near to each other.

PANICLE (Patent). A spreading panicle. Having the pedicels spreading out so as to form an acute angle with the stalk.

PANICLE (Diffuse). A diffused panicle. Having the pedicels spreading out more and irregularly.

PANICLE (Divaricate). A divaricating panicle. Spreading out still more, at an obtuse angle with the stalk.

PANICULATE LEAF. A panicled stem. Having branches variously subdivided.

PANICULATE GRASSES. Panicled grasses. Having their fructifications in a panicle.

PANICUM. Panic grass. In botany, a genus of the class triandria, order digynia. Calyx three-valved, one-flowered; the third valve very small; seed invested with the permanent hardened corol. Eighty-two species scattered

over the globe; of which four are common to our own corn-fields: of these some are spiked, and others panicled.

Those common to our own fields are as follows:

1. P. verticillatum, with whorled spike and diffuse culms. Corn-fields.

2. P. crus galli: spike doubly-compound; glume awned, hispid. Wet fields. There is a variety with the awns ten times as long as the glumes.

3. P. sanguinale. Finger-like spikes; sheaths of the leaves dotted. Corn-fields.

4. P. dactylon. Finger-like spikes; and creeping shoots. Sandy shores.

The two following are also worth particularising:

5. P. Italicum. Spike compound; culm simple; leaves alternate, flat, striate, reflected. It is from this plant the Italians obtain their millet seed; whence its specific name; for it is a native of the Indies.

6. P. miliaceum. Millet panicum. Panicle loose, flaccid; leaves with hairy or glabrous sheaths; glumes mucronate, nerved; culm channelled, branched, leafy. The seeds are the common millet seeds of our own shops. The plant is indigenous to India.

PANKE. In botany, a genus of the class enneandria, order monogynia. Calyx four-cleft; corol campanulate, four-cleft; capsule two-valved, one-seeded. Two species, natives of Chili.

PANNADE. See CURVET.

PANNANACH WELLS, a village in Aberdeenshire, situate a little below the waterfall, called the Lin of Dee, in the valley of Glenmuick. It is noted for its mineral waters; and has a lodge for the accommodation of the company that frequent this place in summer.

PANNELS OF A SADDLE; two cushions, or bolsters, filled with cow, deer, or horse-hair, and placed under the saddle, one on each side, so as to touch the horse's body, and prevent the bows from galling or hurting his back.

PANNICLE. (*panniculus*, dimin. from *pannus*, a woven cloth) *Panniculus carnosus*; carnous membrane, a thin muscular covering attached to the skin in brute animals, by means of which they have the power of shaking it so as to throw off any thing which adheres to the hairy coat and occasions uneasiness. Gibson's account of this superficial muscle is given under the article CUTIS. The fatty panicle is synonymous with CELLULAR MEMBRANE, which see.

PA'NNIER s. (*panier*, French.) A basket, a wicker vessel, in which fruit, or other things, are carried on a horse (*Addison*).

PANNIPUT, a town of Hindustan Proper, situate in an extensive plain between the cities of Delhi and Sirhind.

This plain is celebrated for a battle, in 1761, between an army of 200,000 Mahrattas, and Abdallah, sultan of Candahar, at the head of 150,000 Mahometans, in which the former were totally defeated. Panniput is 72 miles N.W. of Delhi. Lon. 76. 45 E. Lat. 29. 15 N.

PANNONIA, a large country of Europe, bounded on the east by Upper Mœsia, south by Dalmatia, west by Noricum, and north by the Danube. It was first invaded by J. Cæsar, and conquered in the reign of Tiberius. Philip and his son Alexander some ages before had successively conquered it. Its chief city was Sirmium.

PANOMPHÆUS, a sirname of Jupiter, either because he was worshipped by every nation, or because he heard the prayers addressed to him, or because the rest of the gods derived from him their knowledge of futurity. (πας, *omnis*, ομφη, *vox*.)

PANOPE, or PANOPEA, one of the Nereides, whom sailors generally invoked in storms. Her name signifies giving every assistance, or seeing every thing.

PANOPHOBIA. (*panophobia*, πανοφοβια; from παν, all, and φοβος, fear.) That kind of melancholy which is attended with groundless fears. The moderns consider it as symptomatic.

PANO'PLY. s. (πανοπλια.) Complete armour (*Milton*).

PANOPOLIS, the city of Pan, a town of Egypt, called also Chimmis. Pan had there a temple, where he was worshipped with great solemnity.

PANORAMA (from παν, all, and οραμα, a sight, of ωραμαι, perf. pass. of οραω, to see), in the art of painting, a representation of a town, a country, or any interesting scenery, upon the concave surface of a hollow cylinder. This ingenious extension of the art of painting, by means of which the spectator is thrown in the centre of the scene (a thing the possibility of which has been denied by many artists not thirty years ago), is the invention of the late Mr. Barker; whose panoramic pictures of Spithead, Edinburgh, Gibraltar, &c. have deservedly excited great admiration, and been warmly patronized. The son of the inventor still continues, with great zeal and talent, to exhibit to the public fresh pictures of this kind every season in Leicester square.

PANORMO, a town of Turkey in Europe, in Albania, situate on a gulf of the Adriatic, opposite the island of Corfu, 45 miles S.S.E. of Valona. Lon. 20. 2 E. Lat. 40. 0 N.

PANORPA, in zoology, a genus of the class insecta, order neuroptera. Mouth lengthened into a cylindrical, horny proboscis; feelers four, nearly equal; stemmata three; antennas filiform, longer than the thorax; tail of the male armed with a chelate appendage; of the female unarmed. Nine species, scattered over the globe; of which P. communis is the only one indigenous to our own country: its wings are of equal length, spotted with black, and transparent; body longish: it is frequently seen in our meadows during the early part of summer. P. coa, with erect wings, the lower ones nearly linear and very long, is a native of the Greek islands. It is larger than the preceding, and its wings are also beautifully spotted, or banded with brown and yellow.

PANSIE, or Pansy, in botany. See Viola.

To PANT. *v. n.* (*panteler*, old Fr.) 1. To palpitate; to beat as the heart in sudden terrour, or after hard labour (*Crashaw*). 2. To have the breast heaving, as for want of breath (*Dryden*). 3. To play with intermission (*Pope*). 4. To long; to wish earnestly (*Pope*).

Pant. *s.* (from the verb.) Palpitation; motion of the heart (*Shakspeare*).

PANTALARIA, an island in the Mediterranean, between Sicily and the coast of Tunis, 17 miles in circumference. It abounds in cotton, fruits, and wine, and is subject to the king of Naples. Lon. 12. 31 E. Lat. 36. 55 N.

PANTÆNUS, a stoic philosopher, born in Sicily (though some have erroneously supposed him to be a Hebrew) about the beginning of the reign of Commodus. He presided over the celebrated school of Alexandria, where, from the time of St. Mark, the founder of that church, they had always a divine that was eminent for his learning and piety to explain the holy scriptures, and to instruct them in human learning. This employment he was obliged to leave; for, when the Indians required of Demetrius bishop of Alexandria to send them one to instruct them in Christianity, he sent Pantænus, who undertook the mission with joy, and behaved himself very properly in it. We are told, that the Indians had been tinctured with Christianity by St. Bartholomew the apostle; and that Pantænus met with the Hebrew original of St. Matthew's gospel, which the apostle had left there. St. Jerome says that Pantænus brought it with him; and that it was, in his time, preserved in the library of Alexandria. But we suspect St. Jerome to be mistaken in this respect. When Pantænus returned to Alexandria he reassumed the government of the school of that city, which, it is probable, he had, during his absence, committed to the care of St. Clement, a presbyter of Alexandria. He explained the scriptures publicly under the reign of Severus and Antoninus Caracalla; and was, in St. Jerome's opinion, more serviceable to the church by his discourses than by his writings. He published some commentaries upon the Bible, which are lost.

PANTALOON, a sort of garment consisting of breeches and stockings all of one piece; said to have been first introduced by the Venetians.

Pantaloon, on the theatre, is a buffoon or masked person, who performs high and grotesque dances, and shows violent and extravagant postures and airs. The word is likewise used for the habit or dress these buffoons usually wear; which is made precisely to the form of their body, and all of a piece from head to foot. And hence those who wear a habit of this kind, for conveniency, under their other clothes, are called pantaloons of Venice.

PANTHEA, the wife of Abradates, celebrated for her beauty and conjugal affection She was taken prisoner by Cyrus, who refused to visit her, not to be ensnared by the power of her personal charms. She killed herself on the body of her husband, who had been slain in a battle. (Vid. Abradates.)

Panthea, in antiquity, were single statues, composed of the figures, or symbols, of several different divinities together. Father Joubert, who calls them panthea, and who has remarked them sometimes on medals, says their heads are most commonly adorned with the symbols or attributes belonging to several gods.

PANTHEISM, a philosophical species of idolatry leading to atheism, in which the universe was considered as the supreme God. Who was the inventor of this absurd system is, perhaps, not known; but it was of early origin, and differently modified by different philosophers. Some held the universe to be one immense animal, of which the incorporeal soul was properly their God, and the heavens and earth the body of that God; whilst others held but one substance, partly active and partly passive: and therefore looked upon the visible universe as the only Numen. The earliest Grecian Pantheist of whom we read was Orpheus, who called the world the body of God, and its several parts his members, making the whole universe one divine animal. According to Cudworth, Orpheus and his followers believed in the immaterial soul of the world; therein agreeing with Aristotle, who certainly held that God and matter are coeternal; and that there is some such union between them as subsists between the souls and bodies of men. (See Metaphysics.) In the ancient Orphic theology, we are taught that this universe, and all things belonging to it, were made within God; that all things are contained together in the womb of God; that God is the head and middle of all things; that he is the basis of the earth and heaven; that he is the depth of the sea, the air we breathe, the force of the untameable fire; that he is the sun, moon, and stars; that there is one divine body; for, Πανῖα γαρ εν μεγαλω τα δι σωμαῖι κεῖται, "all these things lie in the great body of God."—But further, to prove that the most ancient Greek philosophers resolved all things into God, and made God all, we shall cite a most remarkable passage from Plutarch's Defect of Oracles. "Whereas there are two causes of all generations, the divine and the human, the most ancient theologers and poets attended only to the more excellent of these two; resolving all things into God, and pronouncing this of them universally; Ζευς αρχη, Ζευς μισα, Διος δ εκ πανῖα τελοῦαι, that God is both the beginning and middle, and that all things are out of God; insomuch, that they had no regard at all to the other natural and necessary causes of things; but on the contrary, their juniors, who were called naturalists, deviating from this most excellent and divine principle, placed in all bodies their passions, collisions, mutations, and commixtures." See Spinozism.

PANTHEON (Πανθειον, thus named from παν, all, and θεος, God), in architecture, a temple, or church, of a circular form; dedicated to all the gods, or to all the saints.

The Pantheon of ancient Rome is of all others the most celebrated, and that whence all the rest take their names. It was built by Agrippa, son-in-law of Augustus, in his third consulate, twenty-five years before Christ; though several antiquarians and artists have supposed that the Pantheon existed as long ago as the commonwealth, and that Agrippa only embellished it and added the portico. To this purpose they allege the authority of Dion Cassius, who, speaking of Agrippa, says, he also finished or perfected the Pantheon.

It was dedicated by him to Jupiter Ultor, Jupiter the Revenger; and had the name Pantheon, on account of the great number of statues of the gods ranged in seven niches all round it; and because built of a circular form, to represent heaven, the residence of the gods. It has but one door, and one window, receiving all its light from the top of its dome. It is one hundred and forty-four feet diameter within, and just as much in height, and of the Corinthian order. Before each nich are two columns of antique yellow marble fluted, and of one entire block. The whole wall of the temple, as high as the grand cornice inclusive, is cased with divers sorts of precious marble in compartments: and the frieze is entirely of porphyry.

The eruption of Vesuvius, in the reign of Tiberius, damaged the Pantheon very considerably: but it was successively repaired by Domitian, Adrian, and Septimius Severus: and it subsisted in all its grandeur till the incursion of Alaric, in the time of Honorius: on this occasion it was stripped of several of its statues and ornaments of gold and silver. About thirty-nine years after this, Genseric, king of the Vandals, took away part of its marbles and statues: at length pope Boniface IV. obtaining this Pantheon of the emperor Phocas, converted it into a church, without any alteration in the building; and dedicated it to the Virgin, and all the martyrs. And it still subsists at Rome under the title of Notre Dame de la Rotonda. However in 655, Constantius II. stripped it of its inside and outside brazen coverings, which he transported to Syracuse.

There was also at Rome another Pantheon, dedicated to Minerva, as the goddess of Medicine. It was in the form of a decagon, and the distance from one angle to another measured 22½ feet. Between the angles there were nine chapels of a round figure, designed for so many deities; and over the gate there was a statue of Minerva. The Pantheon of Athens was in many respects little inferior to that of Rome, built by Agrippa. The Greek Christians converted it into a church, dedicated to the Virgin, under the name of Panegia. The Turks changed it into a mosque.

The Pantheon of Nismes was a temple in that city, wherein were twelve niches, or statues, supposed to have been destined for the twelve great gods.

In the Escurial is a magnificent chapel, called Pantheon, thirty-five feet in diameter, and thirty-eight high, from the pavement, which is of marble and jasper inlayed. The whole inside of the chapel is of black marble, except the luthern, and some ornaments of jasper, and red marble.

In this chapel are deposited the bodies of the kings and queens: there are only places made for twenty-six: eight of which are already filled.

PANTHEUS, or Panthus, a Trojan, son of Othryas, the priest of Apollo. When his country was burnt by the Greeks, he followed the fortune of Æneas, and was killed.

PANTHER, in mastiology. See Felis.

PA'NTILE. *s.* A gutter tile.

PA'NTINGLY. *ad.* (from *panting.*) With palpitation (*Shakspeare*).

PA'NTLER. *s.* (*panetier*, Fr.) The officer in a great family, who keeps the bread (*Shak.*).

PA'NTOFLE. *s.* (*pantoufle*, French.) A slipper (*Peacham*).

PANTOLOGIA. Pantology. (from πας, παντος, every thing, and λογος, treatise or instruction.) A work of universal instruction, or science: a cyclopædia or encyclopædia.

PANTOMIME, Παντομιμος, among the ancients, a person who could imitate all kinds of actions and characters by signs and gestures without speaking. The pantomimes made a part in the theatrical entertainments of the ancients; their chief employment was to express, in gestures and action, whatever the chorus sung, changing their countenance and behaviour as the subject of the song varied. They were very ancient in Greece, being derived from the heroic times, according to some; but however this may be, they were certainly known in Plato's time. In Rome it was so late as the time of Augustus before they made their appearance. As to their dress, it was various, being always suited as near as possible to that of the person they were to imitate. The crocota was much used among the Roman pantomimes, in which and other female dresses they personated women.

We have this account of them in Gibbon's history. "The pantomimes, who maintained their reputation from the age of Augustus to the sixth century, expressed, without the use of words, the various fables of the gods and heroes of antiquity; and the perfection of their art, which sometimes disarmed the gravity of the philosopher, always excited the applause and wonder of the people. The vast and magnificent theatres of Rome were filled by 3000 female dancers, and by 3000 singers, with the masters of the respective chorusses. Such was the popular favour which they enjoyed, that in a time of scarcity, when all strangers were banished from the city, the merit of contributing to the public pleasures exempted them from a law which was strictly executed against the professors of the liberal arts."

Pantomimes are still very common in England: they differ indeed in some respects from those of antiquity; but they retain the name, and like these they consist in the representations of things merely by gestures.

PANTON-SHOE, or PANTABLE-SHOE, in farriery, an old invention, contrived for receiving narrow and hoof-bound heels. Its spunges are much thicker on the inside than on the outside, so that the part which rests upon the horn, or hoof, runs sloping to the end, that the thickness of the inside of the shoe may bear up the heel, and throw or push it to the outside. Panton-shoes are described by Guillet to be proper for horses that have false quarters.

PANTRY. *s.* (*paneterie*, Fr.) The room in which provisions are reposited.

PANUCO, a province of New Spain, in the audience of Mexico. The capital, of the same name, is a bishop's see, and is situated on the river Panuco, 170 miles N. by E. of the city of Mexico. Lon. 98. 5 E. Lat. 23. 0 N.

PANZERA. In botany, a genus of the class decandria, order monogynia. Calyx one-leafed, with a four-parted border; petal one, roundish, lateral, convolute at the base; filaments thickened and bearded at the base, five of them barren; legume doubtful. A Guiana tree, sixty feet high.

PAOLI (Pascal), a very celebrated Corsican, was born in 1726, being the son of Giocinto Paoli, a man of considerable weight and influence in that island, previously to the year 1735. Soon after that period the various revolutions his country underwent obliged him to withdraw to Naples; whence in the year 1755 he sent his son Pascal Paoli to assist his countrymen in regaining their liberty. Pascal had no sooner arrived than he was made, though but 29 years old, commandant-general of the island. He established a regular administration among the undisciplined Corsicans, and formed a considerable body of regular troops. He instituted an university, with the view of softening the manners, by cultivating the sciences. Pascal supported the Corsicans for some time against the gold of the Genoese, and the arms of France; but at length the latter prevailed, and Pascal was compelled to retire to England, where he arrived in 1769, and took up his abode in the capital.

A striking display of the character of the legislator and of the subject is given in the following anecdote, related by Paoli to Mr. Boswell, when he visited Corsica: "A criminal," said he, "was condemned to die. His nephew came to me with a lady of distinction, that she might solicit his pardon. The nephew's anxiety made him think that the lady did not speak with sufficient force and earnestness. He therefore advanced, and addressed himself to me, 'Sir, is it proper for me to speak?' as if he felt that it was unlawful to make such an application. I bid him go on. 'Sir,' said he, with the deepest concern, 'may I beg the life of my uncle? If it is granted, his relations will make a gift to the state of a thousand zechins. We will furnish fifty soldiers in pay during the siege of Furiani. We will agree that my uncle shall be banished, and will engage that he shall never return to the island. I knew the nephew to be a man of worth, and I answered him: You are acquainted with the circumstances of this case. Such is my confidence in you, that if you will say that giving your uncle a pardon would be just, useful, or honourable for Corsica, I promise you it shall be granted. He turned about, burst into tears, and left me, saying, 'Non vorrei vendere l'onore della patria per mille zechini. I would not have the honour of our country sold for a thousand zechins.' And his uncle suffered." *Boswell's Corsica*, page 312.

After a residence of twenty years in England, during which his country continued under the sovereignty and dominion of France, new prospects of patriotic utility opened to the exiled chief, and invited him once more to authority and command. The extraordinary revolution which had begun in France, and had, in a short period, changed the whole system of its government and policy, extended its influence to its remotest territories, and rekindled the embers of liberty in Corsica. The simple circumstance of a Frenchman appearing at Bastia in the year 1789, with the national cockade in his hat, revived in the breasts of the Corsicans the almost extinguished spark, which was instantly fanned into a blaze in every part of the country, and wrought a complete revolution, without the expence of one drop of human blood. Immediately after this, the national convention passed a decree, in which the island was recognized as a department of France, and therefore entitled to its privileges; and they proceeded to reorganise its government upon the principles of the French constitution. The restoration of Paoli was regarded as an indispensable part of the measures to be adopted, and an application to this effect was directed to him, both from the National Convention and his countrymen. How great soever his satisfaction might have been to behold the prospect of emancipation and liberty which opened to his long-oppressed country, he hesitated to return. He considered it as still forming a part of France, and he could but ill reconcile his great mind to resume his station at the head of its affairs, while his government was to be subject to the control of a foreign power. But the earnest intreaties of his grateful countrymen, from whose hearts the interval of twenty years could not obliterate their deep sense of their obligations to his wisdom and valour, supported by the warm solicitations of the French assembly, finally prevailed. He resigned his pension, with feelings and acknowledgments to the generous people from whom he had enjoyed it, which reflected the highest honour upon the breast where every virtue seemed to be concentrated, and embarked once more for his native shores. On the 23d of April 1790, attended by deputies from Corsica, he presented himself at the bar of the national assembly at Paris. He was greeted on his entrance by

shouts of rapturous applause: such was the enthusiasm communicated by the appearance of the great advocate of freedom to the breasts of those who were themselves but newly liberated from the shackles of oppression. The patriotic chief addressed the assembly with dignified composure, and impressive eloquence, in a speech expressive of the happiness he felt, after twenty years of exile from his country, to behold it once more about to be restored to the enjoyment of the sacred privileges of freedom, and of his readiness cheerfully to co-operate with the ruling powers of France, to render that enjoyment solid and permanently advantageous to his fellow citizens. Paoli now took the necessary oaths as a subject of the republic, and hastened to take upon himself the high and honourable charge to which he was called not only by Corsica and France, but by the unanimous voice of all Europe.

Hardly had he received the gratulations of his country on his return, and entered upon the duties of his new trust, before he found the whole of his prospects darkened and interrupted by the changes which were daily taking place in France, by the alternate ascendancy of different factions, and ultimately by the condemnation and execution of the king. The struggles of contending parties which at this time convulsed the whole of France considerably affected public opinion in Corsica. In some of the pieves, or departments, the violence of party spirit broke out into open tumult, and it was soon discovered that there was a disposition in a very great part of the inhabitants to avail themselves of the unsettled state of politics in the mother country to break their connection with it, and to shake off the yoke by which they were subjugated. To this party Paoli, after seriously considering the precarious condition of the island and of his government while subjected to a country which was itself the theatre of constant disorder, and the prey of turbulent factions, gave his powerful and commanding sanction. He was on this occasion joined by all the clergy of the country, who formed themselves into a military corps under the denomination of the sacred band. There was at this time a considerable body of French troops stationed in the different garrisoned towns. Finding that Paoli was taking measures to break from his allegiance, and being joined and instigated by some Corsican families, who were at enmity with him, they formally took the field against him; but the force which he had been able to collect by the popularity of his cause and the universal attachment to his person was so great, that he was not long in deciding the contest and vanquishing his adversaries. He was then invested with his original dignities of president of the consulta, and commander in chief of the island, dignities which he had held with the highest honour before his country had become a province of France. The national assembly were greatly enraged at this counter-revolution, and alienation of Corsica from its sovereignty and dominion: they denounced Paoli to be a rebel, set a price upon his head, passed a decree to cashier the consulta, or national council, which he had re-established, and annulled, at least in words, which was all they had the power to effect, the authority which had been confided to him. Paoli was, however, too much beloved by his countrymen to be betrayed by them, and they were likewise little disposed to attend to the mandates or tremble at the denunciation of a government too distracted and impotent to do them immediate injury. Paoli saw nevertheless that it would not be possible to resist with success the power of France when once seriously directed to reduce the island to subjection; and well knew that a voluntary submission would not be received without being attended with fatal consequences to many individuals who had been instrumental in effecting its independence; he therefore resolved upon an alternative which appeared to him to promise the greatest security, and to hold out the fairest prospect of future tranquillity and happiness to his country, which was to obtain from his countrymen a voluntary surrender of the island to Great Britain. With this view he addressed a letter to them, dated from Furiani, May 1st, 1794, in which he explained at large his views and wishes, and advised that a meeting of the deputies should be held at Corte on the eighth of June following, to take into serious consideration the propriety of concluding the union which he proposed to them. In the conclusion of this letter he writes; "With respect to myself, my dearly beloved countrymen, after having devoted every moment of my life to your happiness, I shall esteem myself the happiest of mankind, if, through the means I have derived from your confidence, I can obtain for our country the opportunity of forming a free and lasting government, and of preserving to Corsica its name, its unity and independence, whilst the names of the heroes who have spilt their blood in its support and defence will be, for future generations, objects of noble emulation, and grateful remembrance." This assembly of the deputies took place on the 14th of June. It was opened by an eloquent speech from Paoli, who took a review of the different events which had transpired, and the measures which had been adopted by him since the separation of the last general consulta in May 1793, explained the purpose for which they had been convoked, and directed them to the weighty measures on which they would have to deliberate. After voting their unanimous thanks to Paoli, and expressing their full approbation of his conduct, they proceeded to declare "the separation of Corsica from France, and with the same unanimity, and with the strongest demonstrations of joy, voted the union of Corsica to the crown of Great Britain:" and it is added, "that no national act was ever sanctioned by a more unanimous proceeding on the part of those who were authorised to do it, or by a more universal approbation, amounting to enthusiasm, on the part of the people." All the proceedings on this occasion were con-

ducted with the strictest order and propriety; no measure being adopted in haste, or settled without full and dispassionate consideration. The necessary previous arrangements being formally concluded, the government was transferred to the English commissioner, sir Gilbert Elliot (now lord Minto), who took possession of it as viceroy for the king of Great Britain. Paoli had now resigned the dignities of office, and reduced himself to the rank of a private citizen. What his intentions might have been with regard to his future residence, whether he meant to pass the remainder of his days in his native country or elsewhere, it is now impossible to say; but it is stated that a coolness which, from some cause or other, had unfortunately taken place between him and the English viceroy, at once determined him to quit Corsica; and he returned to the hospitable shores of that country where he had before experienced the kindest reception, and enjoyed a long interval of comfort and happiness. Having had the misfortune to lose the bulk of his property by the failure of a house at Leghorn, to which he had entrusted it, he was unable, on his return to London, to command the conveniences which his income had before placed within his power, and obliged for some time to live in the most private manner in an obscure part of the town. There is reason to believe, however, that when his pecuniary circumstances became known, prompt measures were adopted to improve them, and that his pension was again restored, and continued to him to the last.

The eventful life of this truly great man, great in all those noble and benign qualities which impart dignity and honour to the living, and consecrate the memory of the dead, was closed, after a short but painful illness, on Thursday the fifth of February, 1807, aged 81 years; and he was buried on Friday the thirteenth of the same month, without pomp or ostentation, in the burying ground of St. Pancras. Though dead, his name shall continue to exist while virtue has a friend. Future generations will contemplate his character with wonder and veneration, and Paoli shall be enrolled among those benefactors of their kind who have immortalized themselves by transcendant actions of benevolence.

The following is an eulogium of no mean worth, drawn by the masterly pen of Voltaire, and occasioned by the consideration of this part of Paoli's conduct. "Quelque chose qu'on ait dit de lui (Paoli) il n'est pas possible que ce chef n'eut de grandes qualités. Etablir un gouvernment regulier chez un peuple qui n'en voulait point; réunir sous les mèmes lois des hommes divisés et indisciplinés; former à la fois des troupes reglées, et instituer une espèce d'université qui pouvait adoucir les mœurs, etablir des tribunaux de justice, mettre un frein à la fureur des assassinats et des meurtres, policer la barbarie, se faire aimer en se fesant obéir; tout cela n'etait pas assurément d'un homme ordinaire. Il ne put faire assez, ni pour rendre la Corse libre, ni pour y regner pleinement; mais il en fit assez pour acquérir de la gloire." *Voltaire, Siecle de Louis XV. Article De la Corse.*

PA-OOM, one of the New Hebrides, in the S. Pacific Ocean, to the S. of Malicollo. Lon. 168. 28 W. Lat. 16. 30 S.

PAO-TING-FOU, a city of China, the most considerable in the province of Pet-cheli, next to that of Pekin. Its district contains three cities of the second, and 17 of the third class. It is 60 miles S. by W. of Pekin.

PAP. *s.* (*papa*, Italian; *pappe*, Dutch; *papilla*, Lat.) 1. The nipple; the dug sucked (*Spenser*). 2. Food made for infants, with bread boiled in water (*Donne*). 3. The pulp of fruit (*Ainsworth*).

PAPA'. *s.* (παππας.) A fond name for father, used in many languages (*Swift*).

Papa, a strong town of Lower Hungary, in the county of Vesprin, taken from the Turks, in 1683, after the raising of the siege of Vienna. It is seated on a mountain, near the river Marchaltz, 45 miles W. of Buda. Lon 18. 20 E. Lat. 47. 26 N.

PA'PACY. *s.* (*papauté*, Fr. from *papa*, the pope.) Popedom; office and dignity of bishops of Rome (*Bacon*).

PA'PAL. *a.* (*papal*, Fr.) Popish; belonging to the pope; annexed to the bishopric of Rome (*Raleigh*).

PAPAVER. Poppy. In botany, a genus of the class polyandria, order monogynia. Calyx two-leaved; corol four-petalled; stigma radiate; capsule superior, discharging its seeds by pores under the permanent stigma. Twelve species, chiefly natives of Europe, six of the corn-fields and wastes of our own country: one or two of the East. Of these some have bristly, others glabrous capsules.

The species cultivated are as follow:

1. P. somniferum. White poppy. Calyx and capsules glabrous: leaves clasping the stem, cut, glaucous; supposed to be originally of Asia; but now found wild in the south of Europe and the wastes of our own country.

There are several varieties differing in the colour and multiplicity of their petals which are preserved in gardens for ornament. It is the single-flowered sort that is chiefly cultivated for use both in our own country and in India.

It is from the heads of this plant that opium is obtained. The seeds of the plant are for this purpose sown at Bahar in the month of October and November, at about eight inches distance, and well watered till the plants are about half a foot high; when they are covered with a stimulating compost of dung, ammoniacal earth and ashes; after which, just before the flowers appear, they are again watered profusely till the capsules are half grown, at which time the opium is collected, for when fully ripe they yield but little juice. Two longitudinal incisions from below upwards, without penetrating the cavity, are made at sun-set for three or four successive evenings; in the morning the juice is scraped off with an iron scoop, and worked in an iron pot in the sun's heat till it is of a

consistence to be formed into thick cakes of about four pounds weight; these are covered over with the leaves of poppy, tobacco, or some other vegetable, to prevent their sticking together, and in this situation they are dried. See OPIUM.

The heads of this plant are also directed for medicinal use in the form of fomentation, and in the syrupus papaveris albi, a useful anodyne, which often succeeds in procuring sleep where opium fails; it is, however, more especially adapted to children. The seeds of this species of poppy contain a bland oil, and in many places are eaten as food; as a medicine, they have been usually given in the form of emulsion in catarrhs, stranguries, &c.

2. P. rhoeas. Corn or red poppy. Capsules glabrous, nearly globular; stem many-flowered, bristly; all the bristles spreading horizontally; leaves pinnatifid and cut. Cornfields: flowers from June to August.

The heads of this species, like those of the somniferum, contain a milky juice of a narcotic quality; from which an extract is prepared, that has been successfully employed as a sedative. The flowers have somewhat of the smell of opium, and a mucilaginous taste, accompanied with a slight degree of bitterness. A syrup of these flowers is directed in the London pharmacopœia, which has been thought useful as an anodyne and pectoral, and is therefore prescribed in coughs and catarrhal affections.

3. P. Cambricum. Welch poppy. Capsules glabrous, oblong, ending in a beak; stem many-flowered with a few ascending hairs; leaves pinnate and cut; flowers large and yellow, appearing in June. Indigenous to the stony mountains of Great Britain, and especially of Wales.

4. P. orientale. Oriental poppy. Capsules glabrous, globular; stems one-flowered, leafy, rough, with close-pressed bristles; leaves pinnate and serrate, with bristly hairs: flower red. A native of Armenia; and flowers with us in May.

PAPA'VEROUS. *a.* (*papavereus*, from *papaver*, Lat.) Resembling poppies (*Brown*).

PAPAW. The fruit of the carica papapa of Linnéus, a native of both Indies, and Guinea coast of Africa. When the roundish fruit are nearly ripe, the inhabitants of India boil and eat them with their meat, as we do turnips. They have somewhat the flavour of a pompion. Previous to boiling, they soak them for some time in salt and water, to extract the corrosive juice, unless the meat they are to be boiled with should be very salt and old, and then this juice being in them will make it as tender as a chicken. But they mostly pickle the long fruit, and thus they make no bad succedaneum for mango. The buds of the female flowers are gathered, and made into a sweetmeat; and the inhabitants are such good husbands of the produce of this tree, that they boil the shells of the ripe fruit into a repast, and the insides are eaten with sugar in the manner of melons.

PAPAW TREE (North American), a species of ANNONA, which see.

PAPER, a thin flexible leaf, usually white, artificially prepared of some vegetable substance, chiefly to write upon, with ink.

The word is formed from the Greek παπυρος, *papyrus*, the name of an Egyptian plant, called also βιβλος, *biblus*, whereon the ancients used to write.

Various are the materials, on which mankind in different ages and countries have contrived to write their sentiments; as on stones, bricks, the leaves of herbs and trees, and their rinds or barks; also on tables of wood, wax, and ivory; to which may be added plates of lead, linen rolls, &c. At length the Egyptian papyrus was invented; then parchment, then cotton paper, and lastly, the common, or linen paper.

In some places and ages they have even written on the skins of fishes; in others, on the intestines of serpents; and in others, on the backs of tortoises. Mabill. de Re Diplom. lib. i. cap. 8. Fabric. Biblioth Nat. cap. 21, &c. There are few sorts of plants but have at some time been used for paper and books: and hence the several terms, biblos, codex, liber, folium, tabula, tillura, philura, scheda, &c. which express the several parts on which they were written: and though in Europe all these disappeared upon the introduction of the papyrus and parchment, yet in some other countries the use of divers of them obtains to this day. In Ceylon, for instance, they write on the leaves of the talipot. And the Bramin MSS. in the Tulinga language, sent to Oxford from Fort St. George, are written on leaves of the ampana, or palma Malabarica: Hermannus gives an account of a monstrous palm-tree called codda panna, or palma montana Malabarica, which about the thirty-fifth year of its age rises to be sixty or seventy feet high, with plicated leaves nearly round, twenty feet broad; wherewith they commonly cover their houses; and on which they also write; part of one leaf sufficing to make a moderate book. They write between the folds, making the characters through the outer cuticle. Knox. Hist. Ceyl. lib. iii. Le Clerc. Bibl. Univ. tom xxiii. p. 242. Phil. Trans. No. 226. p. 422, seq. Vide Hort. Ind. Malab. p. 3. Phil. Trans. No. 145. p. 108.

In the Maldivce islands, the natives are said to write on the leaves of a tree called macaraquean, which are a fathom and a half long, and about a foot broad. And in divers parts of the East Indies, the leaves of the musa arbor, or plantain-tree, dried in the sun, served for the same use.

Egyptian paper was principally used among the ancients; being made of the papyrus, or biblus, a species of rush, which grew on the banks of the Nile: in making it into paper, they began with lopping off the two extremes of the plant, the head and the root: the remaining part, which was the stem, they cut lengthwise into two nearly equal parts, and from each of these they stripped the scaly pellicles of which it consisted. The innermost of these pellicles were looked on as the best, and that nearest the rind as the worst: they were therefore kept apart, and made to constitute two different sorts of paper. As the pellicles were taken off, they extended them on a table, laying them over each other transversely, so as that the fibres made right angles: in this state they were glued together by the muddy waters of the Nile; or, when those were not to be had, with paste made of the finest wheat flour, mixed with hot water and a sprinkling of vinegar

The pellicles were next pressed, to get out the water, then dried, and lastly flatted and smoothed by beating them with a mallet: this was the Egyptian paper, which was sometimes further polished by rubbing it with a glass ball, or the like.

Bark paper was only the inner whitish rind, inclosed between the bark and the wood of several trees, as the maple, plane, beech, and elm, but especially the tilia, or linden-tree, which was that mostly used for this purpose. On this, stripped off, flatted, and dried, the ancients wrote books, several of which are said to be still extant.

Chinese paper is of various kinds; some is made of the rinds or barks of trees, especially the mulberry-tree and elm, but chiefly of the bamboo and cotton-tree. In fact, almost each province has its several paper. The preparations of paper made of the barks of trees may be instanced in that of the bamboo, which is a tree of the cane or reed kind. The second skin of the bark, which is soft and white, is ordinarily made use of for paper: this is beat in fair water to a pulp, which they take up in large moulds, so that some sheets are above twelve feet in length: they are completed by dipping them, sheet by sheet, in alum water, which serves instead of the size among us, and not only hinders the paper from imbibing the ink, but makes it look as if varnished over. This paper is white, soft, and close, without the least roughness, though it cracks more easily than European paper; is very subject to be eaten by the worms, and its thinness makes it liable to be soon worn out.

Cotton paper is a sort of paper which has been in use upwards of six hundred years. In the grand library at Paris are manuscripts on this paper, which appear to be of the tenth century; and from the twelfth century, cotton manuscripts are more frequent than parchment ones. Cotton paper is still made in the East Indies, by beating cotton a rags to pulp.

Linen or European paper appears to have been first introduced among us towards the beginning of the fourteenth century, but by whom this valuable commodity was invented is not known. The method of making paper of linen or hempen rags is as follows.

The first instrument is called the duster, made in the form of a cylinder, four feet in diameter, and five feet in length. It is altogether covered with a wire net, and put in motion by its connexion with some part of the machinery. A convenient quantity of rags before the selection are inclosed in the duster, and the rapidity of its motion separates the dust from them, and forces it through the wire. It is of considerable advantage to use the duster before selection, as it makes that operation less pernicious to the selectors.

The selection is then to be made; and it is found more convenient to have the tables for cutting off the knots and stitching, and for forming them into a proper shape, in the same place with the cutting-table. The surface both of these and of the cutting-table is composed of a wire net, which in every part of the operation allows the remaining dust and refuse of every kind to escape.

The rags, without any kind of putrefaction, are again carried from the cutting-table back to the duster, and from thence to an engine, where, in general, they are in the space of six hours reduced to the stuff proper for making paper. The hard and soft of the same quality are placed in different lots; but they can be reduced to stuff at the same time, provided the soft is put somewhat later into the engine.

The engine is that part of the mill which performs the whole action of reducing the rags to paste, or, as it may be termed, of trituration. The number of the engines depends on the extent of the paper-work, on the force of water, or on the construction of the machinery.

When the stuff is brought to perfection, it is conveyed into a general repository, which supplies the vat from which the sheets of paper are formed. This vat is made of wood; and generally about five feet in diameter, and two and a half in depth. It is kept in temperature by means of a grate introduced by a hole, and surrounded on the inside of the vat with a case of copper. For fuel to this grate, charcoal or wood is used; and frequently, to prevent smoke, the wall of the building comes in contact with one part of the vat, and the fire has no communication with the place where they make the paper.

Every vat is furnished on the upper part with planks inclosed inwards, and even railed in with wood, to prevent any of the stuff from running over in the operation. Across the vat is a plank which they call the trepan, pierced with holes at one of the extremities, and resting on the planks which surround the vat.

The forms or moulds are composed of wire cloth, and a moveable frame. It is with these that they fetch up the stuff from the vat, in order to form the sheets of paper. The sides of the form are made of oak, which is previously steeped in water, and otherwise prepared to prevent warping. The wire cloth is made larger than the sheet of paper, and the excess of it on all sides is covered with a moveable frame. This frame is necessary to retain the stuff of which the paper is made on the cloth; and it must be exactly adapted to the form, otherwise the edges of the paper will be ragged and badly finished. The wire cloth of the form is varied in proportion to the fineness of the paper and the nature of the stuff.

The felts are pieces of woollen cloth spread over every sheet of paper, and upon which the sheets are laid to detach them from the former, to prevent them from adhering together, to imbibe part of the water with which the stuff is charged, and to transmit the whole of it when placed under the action of the press. The two sides of the felt are differently raised: that of which the hair is longest is applied to the sheets which are laid down; and any alteration of this disposition would produce a change in the texture of the paper. The stuff of which the felts are made should be sufficiently strong, in order that it may be stretched exactly on the sheets without forming into folds, and, at the same, sufficiently pliant to yield in every direction without injury to the wet paper. As the felts have to resist the reiterated efforts of the press, it appears necessary that the warp be very strong, of combed wool, and well twisted. On the other hand, as they have to imbibe a certain quantity of water, and to return it, it is necessary that the woof be of carded wool, and drawn out into a slack thread. These are the utensils, together with the press, which are used in the apartment where the sheets of paper are formed.

The vat being furnished with a sufficient quan-

tity of stuff and of water, two instruments are employed to mix them; the one of which is a simple pole, and the other a pole armed with a piece of board, rounded and full of holes. This operation is repeated as often as the stuff falls to the bottom. In the principal writing-mills in England, they use for this purpose what is called a hog; which is a machine within the vat, that, by means of a small wheel on the outside, is made to turn constantly round, and keep the stuff in perpetual motion. When the stuff and water are properly mixed, it is easy to perceive whether the previous operations have been complete. When the stuff floats close and in regular flakes, it is a proof that it has been well triturated; and the parts of the rags which have escaped the rollers also appear.

After this operation the workman takes one of the forms, furnished with its frame, by the middle of the short sides, and fixing the frame round the wire cloth with his thumbs, he plunges it obliquely four or five inches into the vat, beginning by the long side, which is nearest to him. After the immersion he raises it to a level: by these movements he fetches up on the form a sufficient quantity of stuff; and as soon as the form is raised, the water escapes through the wire cloth, and the superfluity of the stuff over the sides of the frame. The fibrous parts of the stuff arrange themselves regularly on the wire cloth of the form, not only in proportion as the water escapes, but also as the workman favours this effect by gently shaking the form. Afterwards, having placed the form on a piece of board, the workman takes off the frame or deckle, and guides this form towards the coucher; who, having previously laid his felt, places it with his left hand in an inclined situation, on a plank fixed on the edge of the vat, and full of holes. During this operation the workman applies his frame, and begins a second sheet. The coucher seizes this instant, takes with his left hand the form, now sufficiently dry, and, having laid the sheet of paper upon the felt, returns the form by gliding it along the trepan of the vat.

They proceed in this manner, laying alternately a sheet and a felt, till they have made six quires of paper, which is called a post: and this they do with such swiftness, that, in many sorts of paper, two men make upwards of twenty posts in a day. When the last sheet of the post is covered with the last felt, the workmen about the vat unite together, and submit the whole heap to the action of the press. They begin at first to press it with a middling lever, and afterwards with a lever about fifteen feet in length. After this operation, another person separates the sheets of paper from the felts, laying them in a heap; and several of these heaps collected together are again put under the press.

The stuff which forms a sheet of paper is received, as we have already said, on a form made of wire cloth, which is more or less fine in proportion to the stuff, and surrounded with a wooden frame, and supported in the middle by many cross bars of wood. In consequence of this construction, it is easy to perceive, that the sheet of paper will take and preserve the impressions of all the pieces which compose the form, and of the empty spaces between them.

The traces of the wire cloth are evidently perceived on the side of the sheet which was attached to the form, and on the opposite side they form an assemblage of parallel and rounded risings. As in the paper which is most highly finished the regularity of these impressions is still visible, it is evident that all the operations to which it is submitted have chiefly in view to soften these impressions without destroying them. It is of consequence, therefore, to attend to the combination of labour which operates on these impressions. The coucher, in turning the form on the felt, flattens a little the rounded eminences which are in relievo on one of the surfaces, and occasions at the same time the hollow places made by the wire cloth to be partly filled up. Meanwhile, the effort which is made in detaching the form produces an infinite number of small hairs on every protuberant part of the sheet.

Under the action of the press, first with the felts and then without them, the perfecting of the grain paper still goes on. The vestiges of the protuberances made by the wires are altogether flattened, and of consequence the hollows opposite to them disappear also; but the traces formed by the interstices of the wire, in consequence of their thickness, appear on both sides, and are rounded by the press.

The risings traced on each side of the paper, and which can be discovered by the eye on that which is most highly finished, form what is called the grain of paper. The different operations ought to soften, but not destroy it; which is effectually done by employing the hammer. This grain appears in the Dutch paper; which is a sufficient proof that though they have brought this part of the art to the greatest perfection, they have not employed hammers, but more simple and ingenious means. The grain of paper is often disfigured by the felts when they are too much used, or when the wool does not cover the thread. In this case, when the paper is submitted to the press, it takes the additional traces of the warp and the woof, and composes a surface extremely irregular.

The paper the grain of which is highly softened, is much fitter for the purposes of writing than that which is smoothed by the hammer: on the other hand, a coarse and unequal grain very much opposes the movements of the pen; as that which is beat renders them very uncertain. The art of making paper, therefore, should consist in preserving, and at the same time in highly softening, the grain: the Dutch have carried this to the highest perfection.

The exchange succeeds the operation last described. It is conducted in a hall contiguous to the vat, supplied with several presses, and with a long table. The workman arranges on this table the paper, newly fabricated, into heaps; each heap containing eight or ten of those last under the press, kept separate by a woollen felt. The press is large enough to receive two of them at once, placed the one at the other's side. When the compression is judged sufficient, the heaps of paper are carried back to the table, and the whole turned sheet by sheet, in such a manner that the surface of every sheet is exposed to a new one; and in this situation they are again brought under the press. It is in conducting these two operations sometimes to four or five times, or as often as the nature of the paper requires, that the perfection of the Dutch plan consists. If the stuff is fine, or the paper slender, the exchange is less frequently repeated. In this operation it is necessary to alter the situation of the heaps, with regard to one another, every

time they are put under the press; and also, as the heaps are highest toward the middle, to place small pieces of felt at the extremities, in order to bring every part of them under an equal pressure. A single man with four or five presses may exchange all the paper produced by two vats, provided the previous pressing at the vats is well performed. The work of the exchange generally lasts about two days on a given quantity of paper.

When the paper has undergone these operations, it is not only softened in the surface, but better felted, and rendered more pliant in the interior parts of the stuff. In short, a great part of the water which it had imbibed in the operation of the vat is dissipated. By the felting of paper is understood the approximation of the fibres of the stuff, and their adhering more closely together. The paper is felted in proportion as the water escapes, and this effect is produced by the management and reiterated action of the press. Was it not for the gradual operation of the press, the paper would be porous, and composed of filaments adhering closely together. The superiority of the Dutch over the French paper depends almost entirely on this operation.

If the sheets of paper are found to adhere together, it is a proof that the business of the press has been badly conducted. To avoid this inconveniency, it is necessary to bring down the press at first gently, and by degrees with greater force, and to raise it as suddenly as possible. By this means the water, which is impelled to the sides of the heaps, which has not yet escaped, returns to the centre; the sheets are equally dry, and the operation is executed without difficulty.

According to the state of dryness in which the paper is found when it comes from the apartment of the vat, it is either pressed before or after the first exchange. The operation of the press should be reiterated, and managed with great care; otherwise, in the soft state of the paper there is a danger that its grain and transparency are totally destroyed. Another essential principle to the success of the exchange is, that the grain of the paper is originally well raised. For this purpose the wire cloth of the Dutch forms is composed of a rounder wire than that used in France, by which they gain the greatest degree of transparency, and are in no danger of destroying the grain. Besides this, the Dutch take care to proportion the wires even where the forms are equal to the thickness of the paper.

Almost every kind of paper is considerably improved by the exchange, and receives a degree of perfection which renders it more agreeable in the use. But it is necessary to observe at the same time, that all papers are not equally susceptible of this melioration; on the contrary, if the stuff is unequal, dry or weakened by the destruction of the fine parts, it acquires nothing of that lustre and softness, and appearance of velvet, which the exchange gives to stuff properly prepared.

The sheds for drying the paper are in the neighbourhood of the paper-mill, and are furnished with a vast number of cords, on which they hang the sheets both before and after the sizing. The sheds are surrounded with moveable lattices, to admit a quantity of air sufficient for drying the paper. The cords of the shed are stretched as much as possible; and the paper, four or five sheets of it together, is placed on them by means of a wooden instrument resembling a pick-axe. The principal difficulty in drying the paper consists in gradually admitting the external air, and in preventing the cords from imbibing moisture. With regard to the first of these, the Dutch use very low sheds, and construct their lattices with great exactness. By this means the Dutch paper is dried equally, and is extremely supple before the sizing. They prevent the cords from imbibing the water by covering them with wax. In using such cords, the moisture does not continue in the line of contact between the paper and the cord, which prevents the sheet from stretching in that particular place by its weight, and from the folds which the moisture in the subsequent operations might occasion. The Dutch also employ cords of considerable thickness, and place fewer of them under the sheets; by which means they diminish the points of contact, and give a freer and more equal circulation to the air.

The size for paper is made of the shreds and parings got from tanners, curriers, and parchment-makers. All the putrefied parts and the lime are carefully separated from them, and they are inclosed in a kind of basket, and let down by a rope and pulley into the cauldron. This is a late invention, and serves two valuable purposes. It makes it easy to draw out the pieces of leather when the size is extracted from them by boiling, or easy to return them into the boiler if the operation is not complete. When the substance is sufficiently extracted it is allowed to settle for some time; and it is twice filtred before it is put into the vessel into which they dip the paper.

Immediately before the operation a certain quantity of alum is added to the size. The workman takes a handful of the sheets, smoothed and rendered as supple as possible, in his left hand, dips them into the vessel, and holds them separate with his right, that they may equally imbibe the size. After holding them above the vessel for a space of time, he seizes on the other side with his right hand, and again dips them into the vessel. When he has finished ten or a dozen of these handfuls, they are submitted to the action of the press. The superfluous size is carried back to the vessel by means of a small pipe. The vessel in which the paper is sized is made of copper, and furnished with a grate, to give the size when necessary a due temperature: and a piece of thin board or felt is placed between every handful as they are laid on the table of the press.

The Dutch are very careful in sizing their paper, to have every sheet in the same handful of equal dryness; because it is found that the dry sheets imbibe the size more slowly than those which retain some degree of moisture. They begin by selecting the pages in the drying-house; and after having made them supple, and having destroyed the adherence between the sheets, they separate them into handfuls in proportion to the dryness, each of them containing that number which they can dip at one time. Besides this precaution, they take care to apply two sheets of brown paper of an equal size to every handful. This brown paper, firm, solid, and already sized, is of use to support the sheets.

As soon as the paper is sized, it is the practice at some paper-mills to carry it immediately to the drying-house, and hang it before it cools, sheet by sheet, on the cords. The paper, unless particular attention is paid to the lattices of the drying-house, is apt to dry too fast, whereby a great part of the size goes off in evaporation; or, if too slow, it falls to the ground. The Dutch drying-houses are

the best to prevent these inconveniences: but the exchange after the sizing, which is generally practised in Holland, is the best remedy. They begin this operation on the handfuls of paper, either while they are still hot, or otherwise as they find it convenient. But, after the exchange, they are careful to allow the heaps to be altogether cold before they are submitted to the press. Without this precaution the size would either be wholly squeezed out by the press of the exchange, or the surface of the paper become very irregular. It is of consequence that the paper, still warm from the sizing, grows gradually firm, under the operation of the exchange, in proportion as it cools. By this method it receives that varnish which is afterwards brought to perfection under the press, and in which the excellence of the paper either for writing or drawing chiefly consists. It is in consequence of the exchanging and pressing that the Dutch paper is soft and equal; and that the size penetrates into the body of it, and is extended equally over its surface.

The exchange after the sizing ought to be conducted with the greatest skill and attention, because the grain of the paper then receives impressions which can never be eradicated. When the sized paper is also exchanged, it is possible to hang more sheets together on the cords of the drying house. The paper dries better in this condition, and the size is preserved without any sensible waste, because the sheets of paper mutually prevent the rapid operation of the external air. And as the size has already penetrated into the paper, and is fixed on the surface, the insensible progress of a well-conducted drying-house renders all the good effects more perfect in proportion as it is slowly dried.

If to these considerations is added the damage done to the paper in drying it immediately after the press of the sizing-room, whether it is done in raising the hairs by separating the sheets, or in cracking the surface, it is evident that the trouble of the second exchange is infinitely overpaid by the advantage.

When the paper is sufficiently dry, it is carried to the finishing-room, where it is pressed, selected, examined, folded, made up into quires, and finally into reams. It is here put twice under the press; first, when it is at its full size, and secondly, after it is folded.

The principal labour of this place consists in assorting the paper into different lots, according to its quality and faults; after which it is made up into quires. The person who does this must possess great skill, and be capable of attention, because he acts as a check on those who separated the paper into different lots. He takes the sheets with his right hand, folds them, examines them, lays them over his left arm till he has the number requisite for a quire, brings the sides parallel to one another, and places them in heaps under the table. An expert workman, if proper care has been taken in assorting the lots, will finish in this manner near 6000 quires in a day.

The paper is afterwards collected into reams of 20 quires each, and for the last time put under the press, where it is continued for 10 or 12 hours, or as long as the demand of the paper-mill permits. We shall now explain the structure of one of the best paper-mills now in use.

The plan is exhibited in plate 130, where AA is the water wheel fixed upon its shaft or axle BB; on which axle is also fastened the wheel CC, containing 78 teeth or cogs, to turn the wheel No. 2. having 27 teeth, which is placed upon the lower end of the axle W. Upon the same axle is fixed the wheel No. 3. containing 72 teeth, to drive the two pinions No. 4. and 4. each of them having 14 teeth, which are fastened upon the iron axles or spindles, on which axles are likewise fixed the cutting or beating rollers No. 6. and 6. DD, are the engine troughs or boxes in which the beating rollers revolve. EE, a platform round the engines. TT, an elevation of the engine troughs. No. 7. the beating roller, round the circumference of which are fixed plates of steel that cut or beat the rags, by passing over several steel plates screwed together, and fixed in the bottom of the trough with their edges facing the roller. No. 8. and 8. the blinds, or slip boards and washers. FF is the frame of the glazing machine XX, the axle and pivots on which the glazing pole is suspended; the pole being moved by the rod VV, one end of which goes upon a bend or crank in the iron spindle that carries the pinion No 5. having 15 teeth, which is turned by the wheel No. 3. UU, a lever for raising the glazing plate to the pole, or depressing it at pleasure. GG and HH, are the screw presses. II, the windlass and lever for setting the press. NN, the mill-house; and MM, the vat-houses adjoining to it. RR, a stair leading to the lofts. SS, furnaces or fire-places in the wall. Q, a door in the side wall of the mill-house. OP, windows to light the mill-house.

Elevation.—Plate 131. AA, the great wheel, containing 40 float-boards or aws, upon which the water impinges to drive the wheel. B, The shaft or axle of the great wheel. On this axle is also fixed the wheel CC, in which are 78 teeth or cogs, to turn the wheel No. 2. having 27 teeth, which is fastened upon the perpendicular axle ZZ; on which shaft is likewise placed the wheel No. 3. containing 72 teeth, to turn the pinions No. 4. and 4. having each 14 teeth, which are fixed upon the iron axles or spindles, on which spindles are fastened the cutting or beating rollers No. 6. and 6. DD, the engine troughs in which the beating rollers revolve. EE, are covers that inclose the rollers. GG, the frame that carries the axles with the wheels. FF the frame of the glazing engine. XT, the glazing pole suspended on its gudgeon at X, and moved by the horizontal rod T, from a crank or bend in an iron spindle that carries a pinion at No. 5. driven by the wheel No. 3. (which is seen in the plan in No. 1.) V, the glazing plate, made of cast iron, fixed upon a bearer that moves on an iron bolt in the frame at W; and the plate V is raised up at pleasure to the glazing pole XT, by pressing down the longer arm of the lever UU, which moves on an iron bolt in the frame. The gudgeons of axles and rounds of spindles should all turn in bushes of brass. HH, fall or course of the water. KK, the machine and handle that raise the sluice to let the water on the great wheel to turn it round. YY, are frames that support the engines and platforms round them. LL, walls of the mill-house. RR, the couples or frame of the roof. MM, the walls of the vat-houses. NN, their roofs. OP, windows to light the lower part of the house. SS, a stair going up to the lofts. QQ, windows in the upper part of the mill-house, commonly made use of for drying the paper. This description of a paper-mill we have extracted from Gray's Millwright.

In April, 1805, Mr. Joseph Bramah took out a patent for sundry improvements in the art of making paper. These improvements are directed to

four distinct objects in the process of making paper. 1. To perform the office of moulder of the sheets by machinery. 2. To a contrivance for making paper of "endless" sheets. 3. To obviate the necessity of employing many presses for dry work. 4. To render the raising and taking down the ponderous frames on which the paper is hung in the drying-house unnecessary.

From the attainment of the first object it results that the moulding of the sheets may be conducted by persons not possessing the usual skill of those employed in the paper manufactory; and by such application of machinery, sheets of much larger than usual dimensions can easily be made pretty uniform in their weight and thickness. To accomplish this, the dimensions of the vat, called the regulating reservoir, in which the stuff for moulding is usually put, are to be in length and width, exactly the same as those of the proposed sheet, and about 20 inches deep; this vat contains a frame or rim of wood, which is made to slide up and down at pleasure, and, in such manner that the frame may be raised or depressed by a handle or winch applied externally. The paper mould is also carefully fitted on all sides to the interior of the reservoir, and is rested upon the sliding rim so as to be lifted up or lowered, still retaining an horizontal position when the frame is moved down or up for that purpose; the mould and frame moving always uniformly together. On the side or end of this reservoir near the bottom, is cut a tolerably large aperture, through which the water that filled the reservoir can quickly discharge itself. This aperture communicates with a hollow trunk; and there is another cistern, viz. the feeder or stuff-cistern, which has an agitator to prevent the unequal mixing of the pulp and water: but the minuter details of the various parts cannot well be given here.

When the whole is ready for action the regulating reservoir is filled with water till it discharges at the mouth of the external trunk; and then the mould, being at the lowest station, has the wire surface immersed more than a quarter of an inch below the surface of the water; and the valve or lid which covers the mouth of the trunk being then shut, prevents the escape of the water from the interior of the reservoir. While the machine is in this situation, the sluice which opens the communication between the feeder above the mould is lifted up, and admits the stuff from the feeding cistern to flow upon the surface of the mould to any limited gauge allowed for the sheet: when this quantity has flowed, the sluice is quickly shut; and then, by the motion of the apparatus, which lifts and lowers the frame and mould, it is raised with more or less slowness, as experience may suggest, up to its greatest altitude. By opening the valve of the waste trunk at the instant the mould begins to rise, all the water is immediately discharged from above the mould by passing through the wire into the lower part, and is carried off to the former level of the waste, being thus prepared for the depression of another mould: for the loaded one, when raised to its highest station, is made to push away on slides to meet the coucher's hand, who at the same time furnishes the alternate mould; and when the mould is again depressed, the waste valve being shut, the machine is fitted for a second charge; and thus the process is continued with ease and certainty.

By the second improvement paper is made in sheets of any length and width whatever, by a circulating process performed with a wheel or circular frame, composed of rings of thin wood or metal, of three feet or more in diameter, and of a width suitable to the size of paper intended to be made. This wheel is mounted on a horizontal axis, and has a shield on each side the upper extremity of its periphery, made to fit the edges of the extreme rings, in a segment form nearly water-tight, so as to prevent the lateral discharge of fluid passing over the wheel. These rings are kept at their stationary distance by transverse thin bars or ribs similar to those used to strengthen a common paper mould; and when this is done, all the face of this wheel is covered or worked with wire so as to form a complete circular mould. This mould or wheel being placed so as to be capable of being turned by hand or otherwise, a feeding cistern, prepared with stuff (as before), is stationed above the wheel; and by means of a sluice or regulator, this stuff may be let upon the wheel in any required quantity, as that wheel is turning on its axis. Thus, while the water is uniformly carried off by falling through the wire, the pulp is left upon the wheel, as in the instance of the common mould, and a constant and endless process may be kept up to any extent. This Mr. Bramah calls an universal revolving paper mould, in addition to which he fixes a little above or below the horizontal plane passing through the centre of the wheel, and opposite to the feeding point, a roller covered with felt; such roller being fixed in contact with the wheel by means of two springs upon the axis of the former, which regulates and renders uniform and gentle the contact of their peripheries as they are turning each other round,—for it signifies not to which of the axes the mover is applied. This is called the couching roller, since it takes the paper from the mould as they mutually turn. Two other rollers are also covered with felt, or woollen cloth, and placed in firmer contact with each other, and between them the sheet is conducted from the couching roller. These are called squeezing rollers; and after the paper has passed through them it may be passed successively between others, and thus made as dry as possible. The paper is then to be conducted over heated plates, charcoal, or other fires, or passed between the rollers of heated calenders; so that when it leaves the machine it may be fit for use.

By the third improvement the necessity of employing many presses for the dry work is obviated. Mr. Bramah constructs a press on what he calls his patent hydro-mechanical principle, of sufficient power, capacity, and strength, to receive the largest sheets proposed to be made; and also competent to withstand the greatest exertion the preparation of each class of paper may require from the press. This press is to be stationed about the middle of the room where the dry-press work in a paper-mill is carried on: and a rail-road of wood or metal, similar to the rail-roads used in larger works, is extended in a straight line to some distance on each side of the press; so that, by means of this, carriages or planks, moving on small wheels or casters, may be wheeled into the press on one side, and pressed through it to the opposite, when the process of pressing is completed. Instead of more presses, Mr. Bramah proposes to use a considerable number of another kind of apparatus called retainers, which consist of a top and bottom bed of wood or metal, of sufficient strength to resist the re-action of the paper when the press is slackened from its severest squeeze, and to retain it in its

most compressed state for any required length of time, after the grasp of the press has been finally withdrawn: in these retainers vertical bars are fixed at the corners of the lower bed, slide through slits in the upper one, and have each several holes to receive wedges or keys; by which the upper bed of the retainer is made to preserve the state into which it has been pressed, notwithstanding any efforts of the paper and felts to expand to the space they originally occupied. The process of moving these retainers under the press, fixing the upper bed, and then removing the retainer, by means of the rail-road, may be easily understood without dwelling upon particulars. It may just be observed, however, that the head of the press is made so much narrower as to admit the four bars which compose the sides or jambs of each retainer to pass it on each side during the upward motion of the press (for it must be recollected that in Mr. Bramah's press the lower part is compelled to move upward) as the paper is compressed; or, in some cases, four holes are made through the head, or upper bed of the press itself.

By the fourth improvement, which saves the manual labour of raising up and taking down the cumbersome frames on which the paper is hung, much facility is given to the process of hanging and re-hanging the sheets exposed to be dried. The contrivance consists simply in having a proper number of frames something similar to laundress's clothes-horses, stationed at suitable distances from each other by means of upright posts, with grooves fitted to the frames, so that each may be slidden vertically up and down by means of lines and pullies attached to each, just like sash-windows double hung; so that while one of the frames is slidden up to touch the ceiling of the building with its upper edge, the one connected with it may be depressed till its lower edge, or the paper which hangs upon it, may come nearly in contact with the floor. Thus the paper may easily be hung on the frames while they are down within reach, and then they may be elevated to any convenient altitude for drying.

The well-known and established ingenuity of Mr. Bramah, as a mechanical inventor, will always ensure a candid and respectful attention to whatever improvements he may suggest: and in the case of the present specification some material advantage will doubtless result from the adoption of his proposed contrivances. Of these, that described under the second head will be found of much utility in the manufacture of paper for large maps and for the hanging of rooms: but we apprehend that in actual practice some difficulties will arise (which may not yet have occurred to the mind of the inventor), from the effect of contrary forces during the motion of the wheel: with too rapid a motion the centrifugal force would cause the particles upon the wheel to be scattered, which are to constitute the paper; while with too slow a motion the effect of the gravitating force would cause several of them to fall off. Perhaps, however, Mr. B. may advert to these points when he speaks of the "speed which nothing but practice and attention to necessary circumstances can determine."

It ought also to be remarked that Mr. B.'s method of drying by heated plates, charcoal fires, &c. cannot be universally applicable: in many kinds of paper where the beauty consists in softening the grain without destroying it, this method could not, we believe, be adopted at all. Under the action of press in the common way, first with the felts, and then without them, the perfecting of the grain of the paper still proceeds; and the business of the exchange, as the workmen term it, completes the process: but in all this some days are generally employed; and we fancy the nature of the paper would undergo a great and depreciating change, if the sheets were attempted to be brought to the same state of dryness, in a few hours or minutes.

Other patents for nearly like purposes have been taken out by Messrs. Fourdrinier; for descriptions of which see Retrospect of Discoveries, No. 9 and 15.

In a late volume of the Annales de Chimie we meet with some useful hints relative to the manner of re-manufacturing the paper of old books, or any letters or other paper already used for writing or printing, by MM. Deyeux, Pelletier, Molard, and Verkaven.

I. *Process for re-fabricating printed paper:*—All paper of the same quality should be collected, and separated from such as may have any writing on the pages; the edges of those leaves which may have become yellow, and also the backs of books, being cut off by the instrument used by bookbinders. One hundred weight of paper is now to be put, sheet by sheet, into vats, sufficiently capacious to contain it, together with 500 quarts of hot water, but which ought to be filled about one-third. the whole is next stirred by two men for the space of one hour, who are gradually to add as much water as will rise about three inches above the paper; after which it is left to macerate four or five hours; the agitation being occasionally repeated, so as to separate, and at length to form the paper into a kind of paste.

The water is now drawn off by means of pipes, and the pulp conveyed to the mill, where it is to be coarsely ground for one hour; at the expiration of which it is boiled in a cauldron for a similar space, with a sufficient quantity of water to rise four or five inches above it. A short time before the mixture begins to boil, thirteen quarts of caustic ley of potash are to be added to every cwt. of paper. The ley alluded to is prepared by dissolving 100lbs. of potash in 300 quarts of boiling water, to which are to be added 20 lbs. of pulverized quick-lime; and the whole must be briskly agitated, till it become of an uniform consistence, when it is suffered to stand for 12 hours; at the end of this time it must be drawn off, and 75 quarts of boiling water added to the sediment, which being stirred for half an hour, and suffered to stand till it become clear, is to be mixed with the liquor first decanted.

When the paste has boiled in this ley for one hour, the fire is to be extinguished, and the matter suffered to macerate for 12 hours; after which it must be taken out, drained, put into bags, and submitted to the action of a strong press for a similar length of time, to deprive it of all moisture; and, if it appear white, so that the printer's ink be properly extracted, it may be re manufactured in the usual manner.

II. *Process for the re-fabrication of written paper:*—The paper must be sorted; the yellow edges cut off; and the whole thrown, leaf by leaf, into a tub half full of boiling water, where it is to be agitated as before directed. After it has macerated four hours, the water should be drawn off; a fresh quantity of boiling water added; and the mixture stirred for half an hour: at the expiration of which the paper is again left to dissolve for three hours.

The fluid is now drawn off, and 260 quarts of cold water poured on each cwt. of paper; which being perfectly mixed, 6 lbs. of oil of vitriol are to be gradually added; and the whole strongly agitated for a considerable time, that the paper may thoroughly imbibe the liquor.

This composition is next suffered to macerate for twelve hours; the agitation being occasionally repeated, when the tub is to be filled up with cold water; and the mixture again stirred, to wash the paper, which will now be reduced to a perfect paste. Lastly, after drawing off the water, the pulp must be put into bags, pressed, and ground in a mill; after which it is conveyed to the vat, and worked in the manner practised with linen rags.

In the year 1801 a patent was granted to Mr. Koops, for extracting ink from printed paper, and restoring it to its original state. His process varies little from that above described; the paper being agitated in hot water to extract the size, and reduce it into a pulp: next, the adhesion of the ink is to be removed by a caustic alkali prepared of lime and potash, the quantities of which should be proportioned to those of the paper. After discharging the ink, he directs the pulp to be bleached by means of the oxygenated marine acid, in the proportion of 10 or 12 gallons to 140 lbs. of the material; and, when sufficiently whitened, it is re-manufactured in the usual manner. According to the patentee's account, writing paper does not require so large a proportion, if any, of the caustic alkali; but is bleached by confining it in a wooden box, rendered air tight; into which the acid gass is thrown directly from the retort wherein it was produced.

The staining or dyeing of paper is performed by applying, with soft brushes, any of the colours used for tinging other substances, after tempering them properly with size or gum-water. Should the paper not be sufficiently hard to receive the tint without sinking, it will first be necessary to size it, or to employ a larger proportion of gum with the tinging matters. And if the paper is to be of an uniform colour, the latter must be fixed by several thin coatings, each being suffered to dry before another is applied; as the shade will otherwise appear unequal.

As writing paper is often imperfectly sized, in consequence of which the ink is apt to sink, it has been recommended to dissolve a small piece of Roman alum in a glass of pure water. This liquor should be gently spread over the suspected part, with a soft sponge; and, after becoming dry, it may be safely used for writing. Should there be any occasion to write on a printed book, or on paper that is too fresh and moist, it will only be necessary to mix a little gum with the ink. Lastly, in case any book or manuscript be stained with oil, or grease, it has been directed to calcine and pulverize the bones of sheep's trotters; and to apply a small portion of the powder to each side of the stain, which should be placed between two sheets of white paper, and the whole submitted for the space of twelve hours to the action of a press: if the stains do not disappear, the process should be repeated in a warm place.

PAPER-HANGINGS (Painting of). There are three methods of effecting this. The first by printing on the colours; the second by using the stencil; and the third by laying them on with a pencil, as in other kinds of painting. When the colours are laid on by printing, the impression is made by wooden prints, which are cut in such a manner that the figure to be expressed is made to project from the surface by cutting away all the other part; and this, being charged with the colours tempered with their proper vehicle, by letting it gently down on the block on which the colour is previously spread, conveys it from thence to the ground of the paper, on which it is made to fall more forcibly by means of its weight, and the effort of the arm of the person who uses the print. It is easy to conclude that there must be as many separate prints as there are colours to be printed. But where there are more than one, great care must be taken, after the first, to let the print fall exactly in the same part of the paper as that which went before; otherwise the figure of the design would be brought into irregularity and confusion. In common paper of low price, it is usual, therefore, to print only the outlines, and lay on the rest of the colours by stencilling, which both saves the expense of cutting more prints, and can be practised by common workmen, not requiring the great care and dexterity necessary to the using several prints. The manner of stencilling the colours is this: the figure, which all the parts of any particular colour make in the design to be painted, is to be cut out in a piece of thin leather or oil-cloth, which pieces of leather, or oil-cloth, are called stencils; and being laid flat on the sheets of paper to be printed, spread on a table or floor, are to be rubbed over with the colour, properly tempered by means of a large brush. The colour passing over the whole is consequently spread on those parts of the paper where the cloth or leather is cut away, and give the same effect as if laid on by a print. This is nevertheless only practicable in parts where there are only detached masses or spots of colours; for where there are small continued lines, or parts that run one into another, it is difficult to preserve the connection or continuity of the parts of the cloth, or to keep the smaller corners close down to the paper; and therefore, in such cases, prints are preferable. Stencilling is indeed a cheaper method of ridding coarse work than printing; but without such extraordinary attention and trouble as render it equally difficult with printing, it is far less beautiful and exact in the effect. For the outline of the spots of colour want that sharpness and regularity that are given by prints, besides the frequent extra lineations, or deviations from the just figure, which happens by the original misplacing of the stencils, or the shifting the place of them during the operation. Pencilling is only used in the case of nicer work, such as the better imitations of the India paper. It is performed in the same manner as other paintings in water or varnish. It is sometimes used only to fill the outlines already formed by printing, where the price of the colour, or the exactness of the manner in which it is required to be laid on, render the stencilling or printing it less proper; at other times it is used for forming or delineating some parts of the design, where a spirit of freedom and variety, not to be had in printed outlines, are desired to be had in the work. The paper designed for receiving the flock is first prepared with a varnish-ground with some proper colour, or by that of the paper itself. It is frequently practised to print some Mosaic, or other small running figure in colours, on the ground, before the flock be laid on; and it may be done with any pigment of the colour desired, tempered with varnish, and laid on by a print cut correspondently to that end. The method of laying on the flock is this: a wooden print being cut so as above described, for laying on the colour in such

manner that the part of the design which is intended for the flock may project beyond the rest of the surface, the varnish is put on a block covered with leather or oil-cloth, and the print is to be used also in the same manner, to lay the varnish on all the parts where the flock is to be fixed. The sheet, thus prepared by the varnished impression, is then to be removed to another block or table, and to be strewed over with flock, which is afterwards to be gently compressed by a board, or some other flat body, to make the varnish take the better hold of it: and then the sheet is to be hung on a frame till the varnish be perfectly dry, at which time the superfluous part of flock is to be brushed off by a soft camel's-hair brush, and the proper flock will be found to adhere in a very strong manner. The method of preparing the flock is, by cutting woollen rags or pieces of cloth with the hand, by means of a large bill or chopping-knife; or by means of a machine worked by a horse-mill. There is a kind of counterfeit flock-paper, which, when well managed, has very much the same effect to the eye as the real, though done with less expense. The manner of making this sort is, by laying a ground of varnish on the paper, and having afterwards printed the design of the flock in varnish, in the same manner as for the true; instead of the flock, some pigment, or dry colour, of the same hue with the flock required by the design, but somewhat of a darker shade, being well powdered, is strewed on the printed varnish, and produces nearly the same appearance.

Mr. John Middleton lately communicated some improvements in the printing of paper-hangings to the Society of Arts. They are intended to facilitate the conveyance of the paper over the printing-table, and to give a greater pressure than usual to the block, when printing dark grounds:

To facilitate the conveyance of the paper, two cords 36 feet long are stretched from the printers table to the other end of the room through rings, where they are kept tight by a weight appended to their extremities. The paper to be printed is rolled up on a wooden roller at one side of the table, and its ends brought across the table and fastened between two flat ledges that are connected at one end by an hinge, and at the other by a sliding ring; these ledges slide along the two cords on pullies placed at each end of them, and serve to draw forward the paper as it is printed; from the middle of these ledges a cord proceeds to the end of the room, between the other two cords where it passes over a pulley, and thence returns to a roller under the table; the circle of this roller extends beyond the table, and there has a wheel fastened to it, from which projects three pins, each about four inches long, by pressing on which with the foot, the wheel is turned round, and with it the roller; by means of which the paper is drawn forward on the cords a space corresponding to the distance between the pins in the wheel.

The contrivance for giving an extraordinary pressure to the block, consists of a long and a short lever projecting from one side of an axle placed over head above the printers table, which levers and the matters supported by them are balanced by a weight appended to an arm which proceeds from the other side of the axle; from the long lever a cord falls to the ground where a treadle is attached to it: a long pole is jointed to the end of the short lever, and descends from it directly over the place of the block, on which it is made to press by standing on the treadle whenever it is thought proper, and is put out of the way when not wanted, by placing the end of it behind a piece of wood which projects upwards from the back of the table for that purpose.

PA'PER. *a.* Any thing slight or thin (*Burnet*).

To PA'PER. *v. a.* (from the noun.) To register (*Shakspeare*).

PA'PERMAKER. *s.* (*paper* and *make.*) One who makes paper.

PA'PERMILL. *s.* (*paper* and *mill.*) A mill in which rags are ground for paper (*Shaks.*).

PAPER-MONEY, bank-bills.

PAPER-OFFICE, an office in the palace of Whitehall, in which all the public writings, matters of state and council, proclamations, letters, intelligences, negotiations abroad, and generally all dispatches that pass through the offices of the secretaries of state, are lodged by way of library.

PAPE'SCENT. *a.* Containing pap; inclinable to pap (*Arbuthnot*).

PAPHIA, a sirname of Venus, because the goddess was worshipped at Paphos, in the island of Cyprus.

PAPHLAGONIA, a country of Asia Minor, situate at the west of the river Halys, by which it was separated from the Cappadocians. It was divided on the west from the Bithynians by the river Parthenius.

PAPHOS, a famous city of the island of Cyprus. The goddess of beauty was particularly worshipped there, and her altars, though 100 in number, daily smoked with Arabian frankincense. The inhabitants were very lascivious, and the young virgins were permitted by the laws of the place to get a dowry by prostitution.

PAPIAS, bishop of Hierapolis, a city of Phrygia, in Asia Minor, was, according to Irenæus, the disciple of St. John the Evangelist. He introduced the doctrine of the Millennium, or the temporal reign of Christ on the earth for 1000 years.

PAPIER MACHÉ, is a substance made of cuttings of white or brown paper, boiled in water, and beaten in a mortar till they are reduced into a kind of paste, and then boiled with a solution of gum-arabic or of size, to give tenacity to the paste, which is afterwards formed into different toys, &c. by pressing it into oiled moulds. When dry, it is done over with a mixture of size and lamp-black, and afterwards varnished. The black varnish for these toys, according to Dr. Lewis, is prepared as follows. Some colophony, or turpentine, boiled down till it becomes black and friable, is melted in a glazed earthen vessel, and thrice as much amber in fine powder sprinkled in by degrees, with the addition of a little spirit or oil of turpentine now and then: when the amber is melted, sprinkle in the same quantity of sarcocolla, continuing to stir them, and to add more spirit of turpentine, till the whole becomes fluid; then strain out the clear through a coarse hair bag, pressing it gently between hot boards. This varnish, mixed with ivory-black in fine powder, is applied in a hot room

on the dried paper paste, which is then set in a gently heated oven, next day in a hotter oven, and the third day in a very hot one, and let stand each time till the oven grows cold.

PAPILIO. Butterfly. In zoology, a genus of the class insecta, order lepidoptera. Antennas growing thicker towards the tip and generally ending in a knob; wings, when sitting, erect, the edges meeting together over the abdomen: flies in the day-time. Very nearly twelve hundred species scattered over the globe; of which nearly seventy are natives of our own country.

This genus is so extremely voluminous, that it has been judged necessary by every entomologist to divide it into sections and subsections. Fabricius has, upon this subject, been not only more minute, but more fortunate than Linnéus. We shall therefore copy the arrangement of both.

LINNEAN DIVISION.

A. Equites. Upper wings longer from the posterior angle to the tip than to the base; antennas often filiform.
α. Trojans. Generally black; with sanguineous spots on the breast.
β. Greeks. Breast without sanguineous spots; an ocellate spot at the angle of the tail.
† Wings without bands.
†† Wings with bands.
B. Heleconii. Wings narrow, entire, often naked or semitransparent; the upper ones oblong, the lower ones very short.
C. Danai. Wings very entire.
α. Candidi. Whitish wings.
β. Festivi. Variegated wings.
D. Nymphales. Wings denticulate.
α. Gemmati. Wings with ocellate spots.
† On all the wings.
†† On the upper wings only.
††† On the lower wings only.
β. Phalerati. Wings without ocellate spots.
E. Plebeji. Small: the larve often contracted.
α. Rurales. Wings with obscure spots.
β. Urbicolæ. Wings mostly with transparent spots.

FABRICIAN DIVISION.

I. Papilio. Feelers reflected; tongue exserted, spiral; antennas thicker towards the tip.
A. Upper wings longer from the posterior angle to the tip than to the base.
α. Equites. Lower wings cut to admit a free motion of the abdomen.
† Trojans. Generally black, with sanguineous spots on the breast.
†† Greeks. Breast without sanguineous spots; an ocellate spot at the angle of the tail.
β. Satyri. Lower wings dilated on the inner margin into a groove for the reception of the abdomen.
B. Heleconii. Wings oblong, the lower ones short and rounded.
C. Parnassii. Wings rounded, entirely, or partially naked.
D. Wings rounded.
α. Festivi. Lower wings distant at the inner edge.
β. Danai. Lower wings meeting at the inner edge and covering the base of the abdomen.
γ. Nymphales. Lower wings forming a groove for the reception of the abdomen.
II. Hesperia. Feelers compressed and hairy at the base, the tip cylindrical and naked; club of the antennas oblong and often hooked.
α. Rurales. Wings with obscure spots.
β. Urbicolæ. Wings with mostly transparent spots.

These insects feed on the nectar of flowers, and the moisture exsuding from trees; the larves are active, and furnished with tentacles and sixteen feet; they are sometimes spinous and sometimes naked, and feed voraciously on the leaves of various plants; the pupe is naked, quiescent, and attached to trees or other substances by filaments either from the tip or the middle.

There is no tribe of insects that has been more accurately examined, or whose history has been so fully detailed. Reaumur and Fabricius are the naturalists to whom we are chiefly indebted for our knowledge of its extensive numbers, and very curious powers.

Some of the species frequently cast their skin, besides undergoing those more considerable transformations which introduce them into a new sphere of action. Before the fresh tunic is developed, the outer skin is seen to wither and lose the vivacity of its colours, owing to the new coat which already covers the animal beneath, and intercepts the juices which formerly circulated through it: after some efforts this dried covering is rent towards the back part of the head, where the fresh skin appears, and through this aperture the worm makes his escape, leaving his spoils behind.

After undergoing several changes of this kind, the insect prepares to undergo another and still more considerable, which is to introduce it into the state of a chrysalid, deprived of almost all motion, and incapable of taking food. This change is effected nearly in the same manner as the foregoing; but in some it is very long in being accomplished. Several species of the butterfly worm construct in a very ingenious manner a coque, or cocoon, or nut of silk, into which they enter before their transformation, and in which they continue for nine months, without food, before their metamorphoses be accomplished. During this long period they are apparently inanimate, and take no nutriment.

Various substances enter into the composition of the habitations constructed by these animals before their metamorphoses: some are of silk; in some, silk is combined with other matters; several kinds construct no habitation, but are protected by a crustaceous shell, formed by a glutinous substance, exsuding from their

bodies; some are suspended vertically, while others hang horizontally by a thread which surrounds the middle of the body.

The external form of the chrysalids varies according to the species of butterfly that inhabits them; in all, however, there are apertures opposite to the thorax, by which respiration is carried on during the whole period of their inactive state. After the appointed time, when the animal has acquired sufficient vigour, the shell is broken, which at once constituted the grave of the caterpillar and the cradle of the butterfly: the down already grown upon the insect has completely separated it on all sides from the shell, which by the action of the head is broken opposite to that part, and affords free egress to the prisoner it so long confined.

The wings of the butterfly, on its first appearance, are closely folded; but by the help of a liquor constantly circulating through them they are soon expanded, and sufficiently hardened, by the action of the air, to endure the efforts of flying. It is then that the insect enters upon a more enlarged sphere of action, with increased powers: he ranges from flower to flower, darting his rostrum into their nectaries for the delicious stores they contain. Then too in the full possession of every faculty granted to his race, he prepares to multiply and perpetuate it.

This last and most considerable metamorphosis is attended with a greater change in the economy of the animal than any of the preceding; for not only the skin, but the teeth, jaws, and even the cranium, are left behind. The large artery which passes along the body may be considered as a succession of different hearts employed in circulating the blood, which is at that important æra observed to flow in a different direction from what it did before, like the fetus of a quadruped after birth: formerly it circulated from the extremity to the head; it now pursues a course directly opposite.

The quantity of food taken by these animals in their last state is comparatively small to what they antecedently devoured. For a short time after their appearance on the wing, their excrements are voided in a greater quantity, and are red like blood; this is, perhaps, the remains of that food which they contained before their late change. The appearance of this substance on the surface of the earth has at different times been regarded as portentous of some heavy calamity, being supposed to be blood that had dropt from the clouds.

Some of these animals are gregarious, and live in society during every stage of their existence; others live in that state during one period of their existence only. The duration of their life is various, according to the weather; its warmth accelerates every step of their progress, and its cold retards all their developements: a worm produced in an early period of the summer lives only for three months, while the same species, if hatched a little later in the season, lives another year; hence Reaumur has devised a method of prolonging the lives of these animals greatly beyond their natural course.

The butterflies of every species are extremely prolific; a single female at one birth produces several hundred eggs: and one of the most wonderful particulars in the history of these insects, is the precaution with which they provide for the security of their young; some species tear off even the down from their own bodies to supply them with a covering.

Various insects prey upon the butterfly, or hasten the approach of its dissolution. One or two species of ichneumon perforates the body of the insect while a caterpillar, and there deposits its eggs; and, although the caterpillar continues to live, and is metamorphosed into a chrysalid, no butterfly is produced from it, those internal parts that were essential to its perfection being consumed by the larves of the ichneumon. From the great fecundity and variety of the insects of this genus they probably would soon cover the surface of the earth, did not nature provide a bar to their increase by multiplying their enemies: hence they are destined to become the food of a great number of animals of various kinds, some of which swallow them entirely, others macerate their bodies; while many accomplish their destruction by gradually sucking their juices. A single pair of sparrows, in order to supply themselves and their young, may destroy, it has been calculated, three thousand three hundred and sixty butterflies in one week.

The variety and richness of the colours that adorn the greater part of this tribe, have made it an object of especial research by painters as well as by naturalists. In general the tropical climates that heighten the colours both in the plumage of birds, and the scales of fishes, offer the most gaudy specimens of the butterfly.—We have only space to detail an example or two.

1. P. Priamus. Wings indented, silky, upper pair above green with a black disk and edge, lower ones with from four to six black spots; thorax black, with three green spots: this insect measures more than six inches from wing's end to wing's end; the black is of a velvet softness, the silky wings peculiarly lustrous, and the green of the upper pair of the most beautiful grass hue. Linnéus regarded it as the most superb of the whole papilionaceous tribe. It is a native of Amboyna, and very rare. It arranges under the section Equites, Troes, or Trojans.

2. P. Hector. Wings tailed black, both surfaces of the same colour, the upper pair with an interrupted white band, lower ones with numerous crimson spots: head and upper margin of the thorax red. This, also, as its specific name imports, belongs to the same section, and is very appropriately named. It is a native of Asia, and highly beautiful.

3. P. machaon. Wings tailed, both surfaces alike, yellow with a brown border, in which are yellow lunules; angle of the tail fulvous. This is one of the very few of the section Equites that are natives of our own country. It

is commonly known among collectors of this tribe of insects by the name of the *swallow-tailed* butterfly, and is a very elegant species. It is generally found in the month of August on umbelliferous plants. The larve is solitary and glabrous; furnished with tentacles, annulate with black and green, and dotted with red; the pupe is yellowish.

4. P. Apollo. Wings entire, white, spotted with black; lower ones with four eyes above, and six beneath. This is also a beautiful insect, somewhat larger than our great cabbage butterfly; it inhabits Europe, and has been occasionally found in our own gardens. It belongs to the section Parnassii. The larve is solitary, furnished with tentacles, silky, black, with two red dots on the segment on each side; pupe slightly folliculate, ovate, bluish, with red dots on each side on the fore-part.

5. P. Brassicæ. Common large white, or cabbage butterfly. Wings rounded entire, white; tip of the upper pair brown, and (in the male) two brown spots. Inhabits Europe, and is known to every one. Larve cinereous, dotted with black, with three sulphur lines; tail black; pupe pale-green, with three yellow lines, and three globular segments. A species of the Danai section.

6. P. Io. Peacock butterfly. Wings angular, indented, fulvous, spotted with black, and a large blue eye in each. An elegant specimen, inhabiting Europe and our own country. It belongs to the division nymphales. The larve is spinous, black, dotted with white, legs ferruginous: pupe ten-toothed, green with gold-dots, bifid behind.

7. P. Iris. Wings indented, brown with a blue gloss, and whitish interrupted band on each side; all with a single eye; the eyes on the upper pair above blind. Found in our own gardens and in Europe generally: belongs also to the nymphales. The male is spotted with white on the upper wings, and is without the eye. The larve is green with two horns, and oblique pale lines; pupe greenish, bifid at the tip.

PAPILIONACEA. (*papilio*, a butterfly.) In botany, a papilionaceous or butterfly-shaped corol.—Irregular, and usually four-petalled. The lower petal is shaped like a boat, and is called carina or keel: the upper petal, which spreads and rises upwards, is called vexillum, standard or banner: the two side ones stand singly, being separated by the keel, and are called alæ, the wings. The keel is sometimes split, and then this corol is properly five-petalled. These flowers form a natural class, called papilionaceæ; and are to be found in the fifty-fifth order of Linnéus's Fragments, and in the thirty-second of his Natural Orders. They are chiefly comprehended within the order decandria, of the class diadelphia, in the Artificial System. This is one of Tournefort's classes; and is the same with the leguminosæ of Ray and other authors. The pea being the most obvious of these, some call them pea-blossomed flowers.

PAPILLA. (*papilla.*) The nipple of the breast. See Nipple.

PAPILLÆ. This term is applied by anatomists to the fine terminations of nerves, &c. as the nervous papillæ of the tongue, skin, &c.

PAPILLARIS HERBA. See Lampsana.

PA'PILLARY. Pa'pillous. *a.* (from *papilla*, Latin.) Having emulgent vessels, or resemblances of paps (*Derham*).

PAPIRIUS. This name was common to several eminent Romans, the most remarkable of whom are the following:—Carbo, a Roman consul, who undertook the defence of Opimius, who was accused of condemning and putting to death a number of citizens on mount Aventinus without the form of a trial. His client was acquitted.—2. A dictator, who ordered his master of horse to be put to death, because he had fought and conquered the enemies of the republic without his consent. The people interfered, and the dictator pardoned him. Cursor made war against the Sabines, and conquered them, and also triumphed over the Samnites. His great severity displeased the people. He flourished about 320 years before the Christian era.—3. Carbo, a friend of Cinna and Marius. He raised cabals against Sylla and Pompey, and was at last put to death by order of Pompey, after he had rendered himself odious by a tyrannical consulship, and after he had been proscribed by Sylla. 4. Maso, a consul who conquered Sardinia and Corsica, and reduced them into the form of a province. At his return to Rome, he was refused a triumph, upon which he introduced a triumphal procession, and walked with his victorious army to the capitol, wearing a crown of myrtle on his head. His example was afterwards followed by such generals as were refused a triumph by the Roman senate.

PAPISTS, are those who believe the pope or bishop of Rome to be the supreme pastor of the universal church, who profess to believe all the articles of pope Pius's creed, and who promise implicit obedience to the edicts of the church, especially the decrees of the council of Trent. See Pope, Trent, and Nonconformist.

PAPI'STICAL. *a.* (from *papist.*) Popish; adherent to popery (*Whitgift*).

PAPI'STRY. *s.* (from *papist.*) Popery; the doctrine of the Romish church (*Whitgift*).

PAPOUL (St.), a town of France, in the department of Aude, seated on the Lembe, eight miles E. of Castlenaudary, and 35 S.E. of Toulouse. Lon. 2. 10 E. Lat. 43. 21 N.

PAPPENHEIM, a town of Franconia, capital of a county of the same name, with a castle, where the count resides. It is seated near the Altmal, 17 miles N.W. of Neuburg, and 32 S. Nuremburg. Lon. 10. 51 E. Lat. 48. 58 N.

PAPPOPHORUM. In botany, a genus of the class triandria, order digynia. Calyx two-valved, two-flowered: corol two-valved, many-awned. One species, a native of South America, with branched culm; erect panicle; calyx from two to four-flowered.

PAPPUS, a very eminent Greek mathematician of Alexandria towards the latter part of the 4th century, particularly mentioned by Suidas, who says he flourished under the emperor Theodosius the Great, who reigned from the year 379 to 395 of Christ. His writings shew him to have been a consummate mathematician. Many of his works are lost, or at least have not yet been discovered. Suidas mentions several of his works, as also Vossius de Scientiis Mathematicis. The principal of these are, his Mathematical Collections, in 8 books, the first and part of the second being lost. He wrote also a Commentary upon Ptolemy's Almagest; an Universal Chorography; A Description of the Rivers of Libya; a Treatise of Military Engines; Commentaries upon Aristarchus of Samos, concerning the Magnitude and Distance of the Sun and Moon; &c. Of these there have been published, the Mathematical Collections, in a Latin translation, with a large Commentary, by Commandine, in folio, 1588; and a second edition of the same in 1660. In 1644, Mersenne exhibited a kind of abridgment of them in his Synopsis Mathematica, in 4to: but this contains only such propositions as could be understood without figures. In 1655, Meibomius gave some of the Lemmata of the 7th book, in his Dialogue upon Proportions. In 1688, Dr. Wallis printed the last twelve propositions of the 2d book, at the end of his Aristarchus Samius. In 1703, Dr. David Gregory gave part of the preface of the 7th book in the Prolegomena to his Euclid. And in 1706, Dr. Halley gave that preface entire, in the beginning of his Apollonius.

The contents of his principal work, the Mathematical Collections, are exceedingly curious. The only account of them in the English language, with which we are acquainted, is given by Dr. Hutton in his valuable Mathematical Dictionary, to which we refer the inquisitive reader.

PAPPUS. (*pappus.*) The hair on the middle of the chin. See CAPILLUS.

PAPPUS, in botany, (anciently put for *senex*, an old man; whence it was applied to the down on the seed of thistles, &c. being like the gray hairs of old age.) Commonly translated down: but hence arises a confusion between this and the lanugo or tomentum on the surface of leaves, &c. which we usually call down. Pliny, however, will justify us in some degree: for speaking of the cactus (l. 21, c. 16.) he says—*Semen ei lanuginis, quam pappum vocant.* Some endeavour to get rid of this difficulty by translating *pappus*, the feather, but not successfully; for we cannot say a hairy feather and a feathered feather. The French name is *aigrette*. The ladies have adopted this term, and Mr. Martyn proposes to follow their example: if we call it seed-down, all confusion will be avoided.

Linnéus explains it to be—corona (seminis) pennacea pilosave volitans, a feathery or hairy flying crown to the seed. The first he calls pappus plumosus; and indeed it resembles a feather in its structure: the second, capillaris pilosus or simplex; having the hairs undivided. (See CAPILLARY.) This crown is either placed immediately on the seed, and is then said to be *sessilis* or sessile; or else there is a thread interposed between it and the seed, which Linnéus calls *stipes*, and then it is said to be *stipitatus*, stipitate or stiped. This down or egret is one of nature's most obvious means of dispersing seeds to a considerable distance.

PA'PPY. *a.* (from *pap.*) Soft; succulent; easily divided (*Burnet*).

PAPULÆ. (dim. of *pappa*, a dug or nipple.) In medicine, very small and acuminated elevations of the cuticle, with an inflamed base, not containing a fluid, nor tending to suppuration. The duration of papulæ is uncertain, but they terminate for the most part in scurf.

PAPULOSE LEAF. (*papula*, a pimple.) In botany, a pimply, bladdery or blistered leaf. Tectum punctis vesicularibus. Covered with little blisters.

PAPYRUS. Paper-rush. See CYPERUS.

PAR. *s.* (Latin.) State of equality; equivalence; equal value (*Locke*).

PAR VAGUM. (*par, paris*, a pair.) In neurology, the eighth pair of nerves. They arise from the corpora olivaria of the medulla oblongata, and proceed into the neck, thorax, and abdomen. In the neck the par vagum gives off two branches, the lingual and superior laryngeal; and in the thorax four branches, the recurrent laryngeal, the cardiac, the pulmonary, and the œsophageal plexuses. At length the trunks of the nervi vagi, adjacent to the mediastinum, run into the stomach, and there form the stomachic plexus, which branches to the abdominal plexuses.

PARA. (παρα.) A preposition commencing many compound terms in medicine, and the collateral branches of science, and implying proximity in general, but more usually a proximity with inferiority—nearly, almost, something less or below: as pareplegia, a partial palsy; paranoea, defective or diminished judgment, alienation of mind; paronychia, an inflammation near the finger-nail.

PARABLE, a fable or allegorical instruction, founded on something real or apparent in nature or history, from which a moral is drawn, by comparing it with something in which the people are more immediately concerned; such are the parables of Dives and Lazarus, of the Prodigal Son, of the Ten Virgins, &c. Dr. Blair observes, that "of parables, which form a part of allegory, the prophetical writings are full; and if to us they sometimes appear obscure, we must remember, that in those early times it was universally the mode throughout all the eastern nations to convey sacred truths under mysterious figures and representations."

PARABOLA, in geometry, a figure formed by the section of a cone, when cut by a plane parallel to a plane touching the slant side

of the cone. It is expressed by the equation $ax=y^2$, where a is the parameter, x the abscissa, y the corresponding semi-ordinate. See CONIC SECTIONS, and CURVES.

PARABOLAS OF THE HIGHER KINDS, are algebraic curves, defined by the general equation $a^{n-1}x=y^n$; that is, either $a^2x=y^3$, or $a^3x=y^4$, or $a^4x=y^5$, &c.

Some call these by the name of paraboloids; and in particular, if $a^2x=y^3$, they call it a cubical paraboloid; if $a^3x=y^4$, they call it a biquadratical paraboloid, or a sursolid paraboloid. In respect of these, the parabola of the first kind, above explained, they call the apollonian, or quadratic parabola.

Those curves are also to be referred to parabolas, that are expressed by the general equation $ax^{n-1}=y^n$, where the indices of the quantities on each side are equal, as before; and these are called semi-parabolas: as $ax^2=y^3$ the semi-cubical parabola; or $ax^3=y^4$ the semi-biquadratical parabola, &c.

They are all comprehended under the more general equation $a^m x^n=y^{m+n}$, where the two indices on one side are still equal to the index on the other side of the equation; which include both the former kinds of equations, as well as such as these following ones, $a^2x^2=y^4$, or $a^2x^3=y^5$, or $a^4x^3=y^7$, &c.

PARABOLA (Cartesian), is a curve of the 2d order expressed by the equation

$$xy=ax^3+bx^2+cx+d,$$

containing four infinite legs.

PARABOLA (Diverging), is a name given by Newton to a species of five different lines of the third order, expressed by the equation

$$y^2=ax^3+bx^2+cx+d.$$

Of these the fifth is a parabola with two diverging legs, forming at their meeting a cusp or double point, being the case when the equation $0=ax^3+bx^2+cx+d$ has three equal roots; so that $py^2=x^3$ is the most simple equation of this curve, which indeed is the semi-cubical, or neilian parabola.

If a solid generated by the rotation of a semi-cubical parabola, about its axis, be cut by a plane, each of these five parabolas will be exhibited by its sections. For, when the cutting plane is oblique to the axis, but falls below it, the section is a diverging parabola, with an oval at its head. When oblique to the axis, but passes through the vertex, the section is a diverging parabola, having an infinitely small oval at its head. When the cutting is oblique to the axis, falls below it, and at the same time touches the curve surface of the solid, as well as cuts it, the section is a diverging parabola, with a nodus or knot. When the cutting plane falls above the vertex, either parallel or oblique to the axis, the section is a pure diverging parabola. And lastly when the cutting plane passes through the axis, the section is the semi-cubical parabola from which the solid was generated.

PARABOLIC ASYMPTOTE, is used for a parabolic line approaching to a curve, so that they never meet; yet by producing both indefinitely, their distance from each other becomes less than any given line.

There may be as many different kinds of these asymptotes as there are parabolas of different orders. When a curve has a common parabola for its asymptote, the ratio of the subtangent to the absciss approaches continually to the ratio of 2 to 1, when the axis of the parabola coincides with the base; but this ratio of the subtangent to the absciss approaches to that of 1 to 2, when the axis is perpendicular to the base. And by observing the limit to which the ratio of the subtangent and absciss approaches, parabolic asymptotes of various kinds may be discovered. See Maclaurin's Fluxions, art. 337.

PARABOLIC CONOID, is a solid generated by the rotation of a parabola about its axis.

This solid is equal to half its circumscribed cylinder; and therefore if the base be multiplied by the height, half the product will be the solid content.

PARABOLIC PYRAMIDOID, is a solid figure thus named by Dr. Wallis, from its genesis, or formation, which is thus: let all the squares of the ordinates of a parabola be conceived to be so placed, that the axis shall pass perpendicularly through all their centres; then the aggregate of all these planes will form the parabolic pyramidoid.

This figure is equal to half its circumscribed parallelopipedon. And therefore the solid content is found by multiplying the base by the altitude, and taking half the product; or the one of these by half the other.

PARABOLIC SPACE, is the space or area included by the curve line and base or double ordinate of the parabola. The area of this space, as is proved by writers on the Parabola, is $\frac{2}{3}$ of its circumscribed parallelogram; which is its quadrature, and which was first found out by Archimedes, though some say by Pythagoras.

PARABOLIC SPINDLE, is a solid figure conceived to be formed by the rotation of a parabola about its base or double ordinate.

This solid is equal to $\frac{8}{15}$ of its circumscribed cylinder.

PARABOLIC SPIRAL. See HELICOID PARABOLA.

PARABOLIC LEAF. In botany. Cujus diameter longitudinalis superat transversalem, & a basi sursum angustatur in semiovatum. Philos. Bot. Having the longitudinal diameter exceeding the transverse one, and narrowing from the base upwards into a half ovate. In Delin. Pl. it is not so fully expressed—versus apicem sensim angustius rotundatum. Rounded gradually towards the top into a narrower form.

PARABO'LICAL. PARABO'LIC. *a.* (*parabolique*, Fr. from *parable*.) 1. Expressed by parable or similitude (*Brown*). 2. (from *parabola*.) Having the nature or form of a parabola (*Ray*).

PARABO'LICALLY. *ad.* (from *parabolical.*) 1. By way of parable or similitude (*Brown*). 2. In the form of a parabola.

PARABOLIFORM CURVES, a name sometimes given to the parabolas of the higher orders.

PARABOLOIDES, parabolas of the higher orders.

PARABOSCO (Jerome), an Italian dramatic writer of the 16th century: he was the author of several comedies in prose; and some novels in the style of Boccacio, printed in 8vo. at Venice, 1558, under the title of Diporti di Girolemo Parabosco.

PARACELSUS, a celebrated chemist, was born at Einfidlen, in Switzerland, in 1493. His father was the natural son of a master of the Teutonic order, who possessing a good library, was enabled to assist the genius of his son in his early pursuits of learning. His first studies were devoted to physic and surgery; but he was captivated with, and ran into all the extravagances of alchemy. Making a visit to the mines, in Hungary, he had an opportunity of improving his knowledge in metallic chemistry. He went from Germany to Russia, was taken prisoner on the frontiers by the Tartars, and carried before the Cham, who valued his learning, and honoured him by choosing him to accompany his son, the prince, on an embassy to Constantinople, where, as he pretends, he was admitted to the secret of the philosopher's stone. His practice was obscured by a kind of empyrical mystery; but his celebrity was increased by a daring use of the two powerful remedies mercury and opium; no wonder therefore that he was considered as an oracle in the venereal disease. The circumstance of his recovering the famous printer Frobenius of Basil, from a latent disorder, greatly increased his reputation, for he read professional lectures in that city. Notwithstanding Paracelsus vaunted of having discovered the philosopher's stone, he was compelled to sue the canon of Lichtenfels, for the amount of his bill; and although he affirmed that a man might live to the age of Methusalem, by the use of his elixir, he died at the age of 48. He gloried in overturning the system of Galen, though his own contained more absurdities than those of all the writers before him. (*Watkins*).

PARACENTESIS. (*paracentesis*, παρακεντησις; from παρακεντεω, to pierce through.) The operation of tapping to evacuate the water in ascites, dropsy of the ovarium, uterus, &c.

PARACENTRIC MOTION, in astronomy, a term used for so much as a revolving planet approaches nearer to, or recedes farther from, the sun, or centre of attraction.

PARACHUTE, a kind of large and strong umbrella, contrived to break a person's fall from an air-balloon, should any accident happen to the balloon at a high elevation. This contrivance was first thought of by Blanchard, who at different times, by means of the parachute, let fall from his balloon dogs and other animals. He ventured even to descend in this manner himself; but, whether from the bad construction of his parachute, or from falling among trees, he had the misfortune to break one of his legs. *Citizen* Garnerin, as he chooses to be called, was more successful. On the 21st of October 1797, he ascended from the garden de Mausseux at half past five in the evening; between the balloon and the car, in which he sat, was placed the parachute, half opened, and forming a kind of tent over the aërial traveller; and when the whole apparatus was at a considerable height, he separated the parachute and car from the balloon. The parachute unfolding itself, was, by his weight and that of the car, drawn of course towards the earth. Its fall was at first rapid and vertical; but soon afterwards it exhibited a kind of balancing or vibration, and a rotation gradually increasing, which might be compared with that of a leaf falling from a tree. The aëronaut, however, reached the ground unhurt. See AEROSTATIA.

This parachute was of cloth, and its diameter, when unfolded, about twenty-five feet. To use such instruments with success, it is necessary that the car be suspended at a considerable distance from the parachute, so as that the centre of gravity of the whole shall be vertically below the centre of resistance made by the air to the descent of the parachute; for if the car be otherwise placed, it is evident that the parachute will incline to one side, descend obliquely, oscillate, and the smallest irregularity in its figure will cause it to turn round its vertical axis.

PARACLET, the comforter, a name given the Holy Spirit, in the New Testament.

PARACOE. (from παρα, dim. and ακουω, to hear.) A dulness of hearing.

PARACUSIS. (*paracusis*, παρακυσις; from παρα, wrong, and ακυω, to hear.) Hearing depraved Singing in the ears. A genus of disease in the class locales, and order dysæsthesiæ of Cullen: species, 1. Paracusis imperfecta, when existing sounds are not heard as usual.—2. Paracusis imaginaria, when imaginary sounds are heard.

PARA'DE. *s.* (*parade*, French.) 1. Show; ostentation (*Glanville*). 2. Procession; assembly of pomp (*Swift*). 3. Military order (*Milton*). 4. Place where troops draw up to do duty and mount guard. 5. Guard; posture of defence (*Locke*).

PA'RADIGM. *s* (παραδειγμα.) Example.

PA'RADISE. *s.* (παραδεισος.) 1. The blissful regions, in which the first pair was placed (*Milton*). 2. Any place of felicity (*Shaks.*).

PARADISE is principally used for the garden of Eden, in which Adam and Eve were placed immediately upon their creation. As to this terrestrial paradise, there have been many inquiries about its situation. It has been placed in the third heaven, in the orb of the moon, in the moon itself, in the middle region of the air, above the earth, under the earth, in the place possessed by the Caspian sea, and under the arctic pole. The learned Huetius places it upon the river that is produced by the

conjunction of the Tigris and Euphrates, now called the river of the Arabs; between this conjunction and the division made by the same river before it falls into the Persian sea. Other geographers have placed it in Armenia, between the sources of the Tigris, the Euphrates, the Araxis, and the Phasis, which they suppose to be the four rivers described by Moses. But concerning the exact place we must necessarily be very uncertain, if indeed it can be thought at all to exist at present, considering the many changes which have taken place on the surface of the earth since the creation.

PARADISE (Bird of). See PARADISEA.

PARADISE (Tree of). See MUSA.

PARADISI'ACAL. *a.* (from *paradise.*) Suiting paradise; making paradise (*Burnet*).

PARADISEA. Bird of paradise. In zoology, a genus of the class aves, order picæ. Bill covered with a belt of downy feathers at the base; feathers of the sides very long; two of the tail feathers naked. Twelve species, inhabitants of New Guinea or the Papuan Islands, or islands of the Indian ocean. The following are chiefly entitled to notice.

1. P. apoda. Greater paradise bird. Chesnut; neck beneath green gold; feathers on the sides longer than the body; two middle tail-feathers long, bristly.

Another variety, of smaller size; body above yellow; feathers on the sides yellowish white; the two long naked tail-feathers straight and tapering to the tip; the tail, as it is improperly called, is nothing more than the long feathers of the back and flanks. Inhabits the islands near New Guinea, and in the rainy season returns back to New Guinea; feeds on the larger moths and butterflies; flies in flocks, with a leader at the head, all making a noise like the thrush.

Concerning this bird the wild and most improbable fictions have been propagated. It has been said to be of divine origin, and its natural habitation to be the region of the Mosaic paradise.

It was formerly believed by the credulous and ignorant, the most numerous class of men, that it lived alone upon the air and the dew; that it had no entrails, nor feet; but remained perpetually floating upon the air, while sleeping, as well as while awake; while hatching and laying, as well as while procreating its young. Instead of a stomach and intestines, which, to so extraordinary a feeder, would have been useless, the cavity of its abdomen was said to be filled with fat. The hunters who procure and sell these birds cut off their legs, and take away their entrails, the better to preserve and carry them; and perhaps too with a view to perpetuate the belief of those fables, which they have found so beneficial to their trade.

If any thing could give an air of probability to the perpetual flying of the bird of paradise, it might be its extraordinary lightness. A bird no larger than a thrush, swelled to an immense bulk by its feathers, is rendered specifically lighter than any other. About forty or fifty long feathers spring from each side, below the wing, which, mingling with those of the tail, augment the apparent size of the animal, without adding hardly any thing to its weight. However well qualified to support itself in the air, the bird of paradise is unable to direct its flight either across or in opposition to the wind; and it is observed to prefer those places which are most sheltered.

In some parts of India the feathers of this bird bring a great price. They are extremely well suited for the ornaments of dress, both by their lighness and their lustre. About a century ago, they were employed for the same purposes for which those of the ostrich are now purchased. In India, however, they derive their principal value from certain miraculous virtues which the priests have ascribed to them, and which have procured the animal to which they belong the title of the bird of God, *Manuco-Dewata*, whence Buffon has coined the modern French name by which they are known, *manucode*. It is doubted by Dr. Forster whether this bird may not have been the phœnix of antiquity; and it is certain that independently of the divine origin ascribed to both of them, they have other resemblances of traditionary character, yet there is nothing in any of the delineations of Aristotle or Pliny that will fairly apply to the elegant and magnificent bird before us. It was first imported into Europe about the year 1522, by Anthony Pigafutta, who accompanied Magellan in his voyage round the world: in one solitary instance it was imported in a living state into our own country: it had, however, lost all its beautiful floating side-feathers, and did not long survive its arrival.

2. P. regia. King of the birds of paradise. Chesnut purple; beneath whitish; a green-gold band on the breast; two middle tail-feathers filiform, feathered, semilunar at the tip; feathers under the wings longer than the rest; tail short, truncate. Inhabits, like the last, the islands of the Indian ocean, and returns to New Guinea in the rainy season; is less than the last, and much rarer; solitary, and seeks for red berries; from five to seven inches long.

3 P. tristis. Grakle bird of paradise. A triangular, naked space behind the eyes; head and neck brown; body brownish; first quill feathers white from the base to the middle; tail-feathers, except the middle ones, tipt with white. Inhabits the Philippine islands; nine and a half inches long: feeds on fruit, insects, mice, and every kind of grain; builds twice a year in the forked branches of trees; eggs four; when young is easily tamed, and becomes docile and imitative. This bird has a great affinity in all its habits to the grakle genus, yet on account of the downy feathers at the base of the bill it belongs to the present tribe. See Nat. Hist. Pl. CLXV.

PARADISI GRANA. See GRANA PARADISI.

PARADOX. (Παράδοξον, formed from παρα, against, and δοξα, opinion.) In philosophy, a

proposition seemingly absurd, because contrary to the received opinions; but yet true in effect.

PARADO'XICAL. *a.* (from *paradox.*) 1. Having the nature of paradox (*Norris*). 2. Inclined to new tenets, or notions contrary to received opinions.

PARADO'XICALLY. *ad.* (from *paradox.*) In a paradoxical manner (*Collier*).

PARADO'XICALNESS. *s.* (from *paradox.*) State of being paradoxical.

PARADOXO'LOGY. *s.* (from *paradox.*) The use of paradoxes (*Brown*).

PARAGO, or PALAWAN, a large island in the Indian ocean, between the Philippines and Borneo, which has a king, tributary to Borneo. The Spaniards have a fort here.

PARAGO'GE. *s.* (παραγωγη.) A figure whereby a letter or syllable is added at the end of a word, without adding any thing to the sense of it: as, *vast*, *vastly*.

PA'RAGON. *s.* (*paragon*, from *parage*, equality, old French.) 1. A model; a pattern; something supremely excellent (*Shakspeare*). 2. Companion; fellow (*Spenser*).

To PA'RAGON. *v. a.* (*paragonner*, Fr.) 1. To compare; to parallel (*Sidney*). 2. To equal; to be equal to (*Shakspeare*).

PA'RAGRAPH. *s.* (*paragraphe*, French, παραγραφη.) A distinct part of a discourse (*Swift*).

PARAGRA'PHICALLY. *ad.* (from *paragraph.*) By paragraphs.

PARAGUA, the most westerly of the Philippine islands, about 180 miles in length and 20 in breadth. Lon. 117. 44 E. Lat. 10. 0 N.

PARAGUAY, a large country of South America, bounded on the N. by Amazonia, E. by Brazil, S. by Patagonia, and W. by Chili and Peru. It contains six provinces; namely, Paraguay Proper, Parana, Guaria, Uraguay, Tucuman, and La Plata. It has numerous lakes and rivers: of the latter, the three principal are the Parana, Paraguay, and Uraguay; the united streams of which form the celebrated Rio de la Plata. These rivers annually overflow their banks; and on their recess leave them enriched by the slime, that renders the soil extremely fertile. This vast country is far from being wholly subdued or planted by the Spaniards; many parts being still unknown. The principal province of which we have any knowledge is La Plata, from which the whole country is also called La Plata. This province, with all the adjacent parts, is one continued plain for several hundred miles; extremely fertile, and producing cotton in great abundance, tobacco, and the valuable herb called Paraguay, which is peculiar to this country, and the infusion of which is drank, in all the Spanish provinces of South America, instead of tea. Here are also a variety of fruits and very rich pastures; but the country is destitute of woods. Cattle, sheep, horses, and mules are in great abundance; of the latter many thousands are annually sent to Peru. In the mountains towards Tucuman, the condor, the largest bird of the vulture tribe, is not unfrequent; and the ostrich is found in the wide plains. Several independent tribes of indigenes live in the interior, on the Rio Grande; one of them, called Abipons, are a warlike race, and by a novelty in American manners, chiefly cavalry, securing and taming the wild horses introduced by the Spaniards. In 1515, the Spaniards discovered this country by sailing up Rio de la Plata, and, in 1535, founded the town of Buenos Ayres. In 1580 the jesuits were admitted into these fertile regions, and in the next century founded the famous missions of Paraguay; which were a number of colonies, each governed by two jesuits, one of whom was rector, the other his curate; and in process of time, merely by the most wonderful address, they acquired an absolute dominion, both spiritual and temporal, over the natives. In 1757, Spain exchanged the colonies on the E. shore of the Uraguay for the Portuguese colony of St. Sacrament, which caused that river to become the boundary of the respective possessions of the two crowns. In 1767, the court expelled the jesuits, and the natives were put upon the same footing with the other Indians of the Spanish part of South America. Buenos Ayres is the capital.

PARAIBA, a province of Brasil, between those of Rio Grande and Tamarica. It abounds in sugar-canes, brasil-wood, tobacco, and cotton. The chief town is of the same name, and seated on the river Paraiba. The Dutch got possession of it in 1635, and fortified it with a slight rampart; but the Portuguese retook it soon after. Lon. 49. 53 W. Lat. 6. 50 S.

PARALEPSIS. (Παραλειψις.) In rhetoric, a pretence of omitting, or passing over a thing, and yet expressing it by the way.

PARALIPOMENA. (Παραλειπομενα.) A supplement of things omitted, or forgot, in some preceding work, or treatise.

The word is formed from the Greek παραλειπω, *prætermitto*, I pass by. Some authors use the word *subrelictum* instead of *paralipomenon*.

PARALLACTIC, in general, something relating to the parallax of heavenly bodies. See PARALLAX.

PARALLAX, in astronomy, is the difference between the places of any celestial object as seen from the surface, and from the centre of the earth at the same instant.

Let E in figure 2 of parallax given in plate 129 represent the centre of the earth, O the place of an observer on its surface, whose visible horizon is OH, and true horizon EF. Now let ZDT be a portion of a great circle in the heavens, and A the place of any object in the visible horizon; join EA, and produce it to C; then C is the true place of the object, and H is its apparent place, and the angle CAH is the parallax; or, because th[illegible]is in the horizon, it is called the horiso[illegible]lax. But OAE, the angle which the earth's [illegible] subtends at the object, is equal to CAH: hence the horizontal parallax of an object may be defined to be the angle which the earth's semi-diameter subtends at that object.

The whole effect of parallax is in a vertical direction: for the parallactic angle is in the plane passing through the observer and the earth's centre; which plane is necessarily perpendicular to the horizon, the earth being considered a sphere.

The more elevated an object is above the horizon, the less is the parallax, its distance from the earth's centre continuing the same. When the object is in the zenith, it has no parallax; but when in the horizon, its parallax is greatest. The horizontal parallax being given, the parallax at any given altitude may be found by the following rule:

To the logarithmic cosine of the given altitude, add the logarithmic sine of the horizontal parallax, the sum, rejecting 10 from the index, will be the logarithmic sine of the parallax in altitude.

Demonstration.—Let B be the place of an object; produce OB, ED to F and D; then the angle BOZ will be the apparent altitude of the object, BEZ the true altitude, and OBE the parallax in altitude. Now in the triangle AOE,

R : sine OAE : : EA : EO.

And in the triangle OBE

BE (= EA) : EO : : sine BOE : sine OBE.

Hence R : cosine BOA : : sine OAE : sine OBE.

As the two last terms are generally small quantities, the arch may be substituted in place of its sine without any sensible error.

Example.—Let the apparent altitude of the moon's centre be 39° 25′, and the moon's horizontal parallax 56′ 54″. Required the parallax in altitude?

Moon's apparent alt.	39° 25′	cosine 9.8879260
Moon's horizontal par.	56′ 54″	sine 8.2188186
Moon's par. in altitude	43′ 57″	sine 8.1067446

As the apparent place of an object is nearer the horizon than its true place, the parallax is therefore to be added to the apparent altitude, to obtain the true altitude. Hence also an object will appear to rise later and set sooner.

The sine of the parallax of an object is inversely as its distance from the earth's centre.

Demonstration.—Let A be the place of an object, and H the place of the same object at another time, or that of another object at the same instant; join EH, then in the triangles AOE, HOE,

R : sine OAE : : AE : OE

sine OHE : R : : OE : EH.

Hence sine OHE : sine OAE : : AE : EH.

The parallax of an object makes it appear more distant from the meridian than it really is.

Demonstration.—The true and apparent places of an object are in the same vertical, the apparent place being lower than the true; and all verticals meet at the zenith: hence the apparent place of an object is more distant from the plane of the meridian than the true place.

The longitude, latitude, right ascension, and declination of an object are affected by parallax. The difference between the true and apparent longitudes is called the parallax in longitude; in like manner, the differences between the true and apparent latitudes, right ascensions, and declinations, are called the parallax in latitude, right ascension, and declination, respectively.—When the object is in the nonagesimal, the parallax in longitude is nothing, but that in latitude is greatest: and when the object [illegible] meridian, the parallax in right ascension [illegible], and that in declination is a maximum. The [illegible]nt longitude is greater than the true longitude, when the object is east of the nonagesimal, otherwise less; and when the object is in the eastern hemisphere, the apparent right ascension exceeds the true, but is less than the true right ascension when the object is in the western hemisphere. The apparent place of an object is more distant from the elevated poles of the ecliptic and equator than the true place: hence, when the latitude of the place and elevated pole of the ecliptic are of the same name, the apparent latitude is less than the true latitude, otherwise greater; and the apparent declination will be less or greater than the true declination, according as the latitude of the place and declination of the object are of the same or of a contrary denomination.

The parallaxes in longitude, latitude, right ascension, and declination, in the spheroidal hypothesis, may be found by the following formulæ; in which L represents the latitude of the place, diminished by the angle contained between the vertical and radius of the given place; P the horizontal parallax for that place: *a* the altitude of the nonagesimal at the given instant; *d* the apparent distance of the object from the nonagesimal; *l* λ the true and apparent latitudes of the objects; D δ the true and apparent declinations respectively; and *m* its apparent distance from the meridian.

Then par. in long. = P. sine *a*. sine *d*. secant *l*, to radius unity; and par. in lat. = P. cosine *a*. cosine λ ± P. cosine *d*. sine *a*. sine λ.

The sign − is used when the apparent distance of the object from the nonagesimal and from the elevated pole of the ecliptic is of the same affection, and the sign + if of different affection. If the greatest precision be required, the following quantity 0·000001212l6. par. lon. ², sine 2*l*, is to be applied to the parallax in latitude found as above, by addition or subtraction, according as the true distance of the object from the elevated pole of the ecliptic is greater or less than 90°.

Again, par. in right ascen. = P. cosine L. sine *m*. secant D, to radius unity; and par. in declination = P. sine L. cosine δ ∓ P. cosine L. sine δ, cosine *m*.

The upper or lower sign is to be used according as the distance of the object from the meridian and from the elevated pole of the equator is of the same or different affection. Part 2d of par. in declination = 0.000001212l6 par. in right ascen. ², sine 2 D; which is additive to, or subtractive from, part first of parallax in declination, according as the true distance of the object from the elevated pole of the equator is greater or less than 90°.

The parallax always diminishes the altitude of a phænomenon, or makes it appear lower than it would do if viewed from the centre of the earth; and this change of the altitude may, according to the different situation of the ecliptic and equator in respect of the horizon of the spectator, cause a change of the latitude, longitude, declination, and right ascension of any phænomenon, which is called their parallax. The parallax, therefore, increases the right and oblique ascension; diminishes the descension; diminishes the northern declination and latitude in the eastern part, and increases them in the western; but increases the southern both in the eastern and western part; diminishes the longitude in the western part, and increases it in the eastern. Hence it appears, that the parallax has just opposite effects to refraction.

Parallax (Annual), the change of the apparent place of a heavenly body, which is caused by being viewed from the earth in different parts of its orbit round the sun. The annual parallax of all the planets is found very considerable, but that of the fixed stars is imperceptible.

To observe the Moon's Parallax.—Observe very accurately the moon's meridian altitude, and note

the moment of time. To this time, equated, compute her true latitude and longitude, and from these find her declination; also from her declination, and the elevation of the equator, find her true meridian altitude. Subtract the refraction from the observed altitude: then the difference between the remainder and the true altitude will be the parallax sought. If the observed altitude be not meridional, reduce it to the true altitude for the time of observation.

By this means, in 1583, Oct. 12 day 5h. 19m. from the moon's meridian altitude observed at 13° 38′, Tycho found her parallax to be 54 minutes.

To observe the Moon's Parallax in an Eclipse.—In an eclipse of the moon observe when both horns are in the same vertical circle, and at that moment take the altitudes of both horns; then half their sum will be nearly the apparent altitude of the moon's centre; from which subtract the refraction, which gives the apparent altitude freed from refraction. But the true altitude is nearly equal to the altitude of the centre of the shadow at that time; now the altitude of the centre of the shadow is known, because we know the sun's place in the ecliptic, and his depression below the horizon, which is equal to the altitude of the opposite point of the ecliptic, in which the centre of the shadow is. Having thus the true and apparent altitudes, their difference is the parallax sought.

De la Hire makes the greatest horizontal parallax 1° 1′ 25″, and the least 54′ 5″. M. le Monnier determined the mean parallax of the moon to be 57′ 12″. Others have made it 57′ 18″.

In the Philosophical Transactions for 1764, there is given a very ingenious method by Dr. Murdoch for finding the moon's parallax and distance, from the received principles of gravitation. He thence finds the mean horizontal parallax at the equator 57′ 12″ 34, supposing the earth immoveable; and 56′ 44″ 07, supposing the earth and moon to revolve about their common centre of gravity.

To observe the Parallax of Mars.—1. Suppose Mars in the meridian and equator at H; and that the observer, under the equator in A, observes him culminating with some fixed star. 2. If now the observer were in the centre of the earth, he would see Mars constantly in the same point of the heavens with the star; and therefore, together with it, in the plane of the horizon, or of the 6th horary: but since Mars here has some sensible parallax, and the fixed star has none, Mars will be seen in the horizon, when in P, the plane of the sensible horizon; and the star, when in R, the plane of the true horizon: therefore observe the time between the transit of Mars and of the star through the plane of the 6th hour.—3. Convert this time into minutes of the equator, at the rate of 15 degrees to the hour; by which means there will be obtained the arch PM, to which the angle PAM, and consequently the angle AMD, is nearly equal; which is the horizontal parallax of Mars. (Pl. 129, fig. 3).

If the observer be not under the equator, but in a parallel IQ, that difference will be a less arch QM: wherefore, since the small arches QM and PM are nearly as their sines AD and ID; and since ADG is equal to the distance of the place from the equator, *i.e.* to the elevation of the pole, or the latitude; therefore AD to ID, as radius to the cosine of the latitude; say, as the cosine of the latitude ID is to radius, so is the parallax observed in I, to the parallax under the equator.

Since Mars and the fixed star cannot be commodiously observed in the horizon; let them be observed in the circle of the 3d hour: and since the parallax observed there TO, is to the horizontal one PM, as IS to ID: say, as the sine of the angle IDS, or 45° (since the plane DO is in the middle between the meridian DH and the true horizon DM), is to radius, so is the parallax TO to the horizontal parallax PM.

If Mars be likewise out of the plane of the equator, the parallax found will be an arch of a parallel; which must therefore be reduced, as above, to an arch of the equator.

Lastly, if Mars be not stationary, but either direct or retrograde, by observations for several days find out what his motion is every hour, that his true place from the centre may be assigned for any given time.

By this method Cassini, who was the author of it, observed the greatest horizontal parallax of Mars to be 25″; but Mr. Flamsteed found it near 30″. Cassini observed also the parallax of Venus by the same method.

To find the Sun's Parallax.—The great distance of the sun renders his parallax too small to fall under even the nicest immediate observation. Many attempts have indeed been made, both by the ancients and moderns, and many methods invented for that purpose. The first was that of Hipparchus, which was followed by Ptolomy, &c. and was founded on the observation of lunar eclipses. The second was that of Aristarchus, in which the angle subtended by the semi-diameter of the moon's orbit, seen from the sun, was sought from the lunar phases. But these both proving deficient, astronomers are now forced to have recourse to the parallaxes of the nearer planets, Mars and Venus. Now from the theory of the motions of the earth and planets, there is known at any time the proportion of the distances of the sun and planets from us; and the horizontal parallaxes being reciprocally proportional to those distances; by knowing the parallax of a planet, that of the sun may be thence found.

Thus Mars, when opposite to the sun, is twice as near as the sun is, and therefore his parallax will be twice as great as that of the sun. And Venus, when in her inferior conjunction with the sun, is sometimes nearer us than he is; and therefore her parallax is greater in the same proportion. Thus, from the parallaxes of Mars and Venus, Cassini found the sun's parallax to be 10″; from whence his distance comes out 22000 semidiameters of the earth.

But the most accurate method of determining the parallaxes of these planets, and thence the parallax of the sun, is that of observing their transit. However, Mercury, though frequently to be seen on the sun, is not fit for this purpose; because he is so near the sun, that the difference of their parallaxes is always less than the solar parallax required. But the parallax of Venus, being almost four times as great as the solar parallax, will cause very sensible differences between the times in which she will seem to be passing over the sun at different parts of the earth. With the view of engaging the attention of astronomers to this method of determining the [illegible] parallax, Dr. Halley communicated to [illegible]yal Society, in 1691, a paper containing an [illegible]unt of the several years in which such a transit may happen, computed from the tables which were then in use: those at the ascending node occur in the month of November O. S. in the years 918, 1161, 1396, 1631, 1639, 1874, 2109, 2117; and

at the descending node in May O. S. in the years 1048, 1283, 1291, 1518, 1526, 1761, 1769, 1996, 2004.

Mr. Short with great labour deduced the quantity of the sun's parallax from the best observations that were made of the transit of Venus, on the 6th of June, 1761 (for which see Phil. Trans. vol. 51 and 52), both in Britain and in foreign parts, and found it to have been 8″·52 on the day of the transit, when the sun was very nearly at his greatest distance from the earth; and, consequently, 8″.65 when the sun is at his mean distance from the earth. See Philos. Trans. vol. 52, p. 611, &c. Whence,

As sin. 8″·65	log.	5·6219140
to radius		10·0000000
So is 1 semidiameter		0·0000000
to 23882·84 semidiameters		4·3780860

that is, 23882 $\frac{84}{100}$ is the number of the earth's semidiameters contained in its distance from the sun; and this number of semidiameters being multiplied by 3985, the number of English miles contained in the earth's semidiameter (though later observations make this semidiameter only 3956½ miles), there is obtained 95,173,127 miles for the earth's mean distance from the sun. And hence, from the analogies under the article Distance, the mean distances of all the rest of the planets from the sun, in miles, are found as follow, viz.

Mercury's distance	36,841,468
Venus's distance	68,891,486
Mars's distance	145,014,148
Jupiter's distance	494,990,976
Saturn's distance	907,956,130

In another paper (Philos. Trans. vol. 53, p. 169) Mr. Short states the mean horizontal parallax of the sun at 8″·69. And Dr. Hornsby, from several observations of the transit of June 3d, 1769 (for which see the Philos. Trans. vol. 59) deduces the sun's parallax for that day equal to 8·65, and the mean parallax 8″·78; whence he makes the mean distance of the earth from the sun to be 93,726,900 English miles, and the distances of the other planets thus:

Mercury's distance	36,281,700
Venus's distance	67,795,500
Mars's distance	142,818,000
Jupiter's distance	487,472,000
Saturn's distance	804,162,000

See the Philos. Trans. vol. 61, p. 572.

But others, by taking the results of those observations that are most to be depended on, have made the sun's parallax at his mean distance from the earth to be 8·6045; and some make it only 8.54. According to the former of these, the sun's mean distance from the earth is 95,109,736 miles; and according to the latter it is 95,834,742 miles. For a detailed account of the methods employed on this occasion, see the treatises on astronomy by Ferguson, O. Gregory, and Vince.

Laplace has explained a method in his Mécanique Céleste of determining the sun's parallax by means of a lunar inequality, which depends upon the distance of the earth and sun. His result is 26″ 4205 of the new French division, or 8″·56024 of the sexagesimal scale: and this gives 24096 radii of the earth for the sun's mean distance. See Méc. Céleste, tom. iii. pa. 281, 282.

PA'RALLEL. *a.* (παραλληλος.) 1. Extended in the same direction, and preserving always the same distance (*Brown*). 2. Having the same tendency (*Addison*). 3. Continuing the resemblance through many particulars; equal (*Watts*).

Parallel, in geometry, an appellation given to lines, surfaces, and bodies, every where equidistant from each other. See Geometry.

Parallel sphere, that situation of the sphere wherein the equator coincides with the horizon, and the poles with the zenith and nadir.

Parallel sailing. See Navigation.

Parallels of latitude, in astronomy, are lesser circles of the sphere parallel to the ecliptic, imagined to pass through every degree and minute of the colures.

Parallels of altitude, or Almucantars, are circles parallel to the horizon, imagined to pass through every degree and minute of the meridian between the horizon and zenith, having their poles in the zenith.

Parallels of declination, in astronomy, are the same with parallels of latitude in geography.

Pa'rallel. *s.* (from the adjective.) 1. Line continuing its course, and still remaining at the same distance from another line (*Pope*). 2. Line on the globe marking the latitude. 3. Direction conformable to that of another line (*Garth*). 4. Resemblance; likeness; conformity continued through many particulars (*Denham*). 5. Comparison made (*Addison*). 6. Any thing resembling another (*South*).

To Pa'rallel. *v. a.* (from the noun.) 1. To place so as always to keep the same direction with another line (*Brown*). 2. To keep in the same direction; to level. 3. To correspond to (*Burnet*). 4. To be equal to; to resemble through many particulars (*Dryden*). 5. To compare (*Locke*).

Parallel ruler, an instrument consisting of two wooden, brass, &c. rulers equally broad every where; and so joined together by the cross blades, pl. 129, fig. 4. as to open to different intervals, accede and recede, and yet still retain their parallelism.

The use of this instrument is obvious; for one of the rulers being applied to RS, and the other withdrawn to a given point V, a right angle AB, drawn by its edge, through V, is a parallel to RS.

PARALLELISM, the quality of a parallel, or that which denominates it such. Or it is that by which two things, as lines, rays, or the like, become equidistant from one another.

Parallelism of the earth's axis, is that invariable situation of the axis, in the progress of the earth through the annual orbit, by which it always keeps parallel to itself; so that if a line be drawn parallel to its axis, while in any one position; the axis, in all other positions or parts of the orbit, will always be parallel to the same line.

In consequence of this parallelism, the axis of the earth points always, as to sense, to the

same place or point in the heavens, viz. to the poles. Because, though really the axis, in the annual motion, describes the surface of a cylinder, whose base is the circle of the earth's annual orbit, yet this whole circle is but as a point in comparison with the distance of the fixed stars; and therefore all the sides of the cylinder seem to tend to the same point, which is the celestial pole. To this parallelism is owing the change and variety of seasons, with the inequality of days and nights.

This parallelism is the necessary consequence of the earth's double motion; the one round the sun, the other round its own axis. Nor is there any necessity to imagine a third motion, as some have done, to account for this parallelism.

Parallelism of rows of trees. The eye placed at the end of an alley bounded by two rows of trees, planted in parallel lines, never sees them parallel, but always inclining to each other, towards the farther end.

Hence mathematicians have taken occasion to enquire, in what lines the trees must be disposed, to correct this effect of the perspective, and make the rows still appear parallel. And, to produce this effect, it is evident that the unequal intervals of any two opposite or corresponding trees may be seen under equal visual angles.

For this purpose, M. Fabry, Tacquet, and Varignon observe, that the rows must be opposite semi-hyperbolas. See the Mem. Acad. Sciences, an. 1715

But notwithstanding the ingenuity of their speculations, it has been proved by D'Alembert and Bouguer, that to produce the effect proposed, the trees are to be ranged merely in two diverging right lines.

PARALLELOGRAM, in geometry, is a quadrilateral right-lined figure, whose opposite sides are parallel to each other.

A parallelogram may be conceived as generated by the motion of a right line, along a plane, always parallel to itself.

Parallelograms have several particular denominations, and are of several species, according to certain particular circumstances, as follow:

When the angles of the parallelogram are right ones it is called a rectangle—When the angles are right, and all its sides equal, it is a square.—When the sides are equal, but the angles oblique ones, the figure is a rhombus or lozenge. And when both the sides and angles are unequal, it is a rhomboides.

Parallelogram of the hyperbola, is the parallelogram formed by the two asymptotes of an hyperbola, and the parallels to them, drawn from any point of the curve. This term was first used by Huygens, at the end of his Dissertatio de Causa Gravitatis. This parallelogram, so formed, is of an invariable magnitude in the same hyperbola; and the rectangle of its sides is equal to the power of the hyperbola.

This parallelogram is also the modulus of the logarithmic system; and if it be taken as unity or 1, the hyperbolic sectors and segments will correspond to Napier's or the natural logarithms; for which reason these have been called the hyperbolic logarithms. If the parallelogram be taken = ·43429448190, &c. these sectors and segments will represent Briggs's logarithms; in which case the two asymptotes of the hyperbola make between them an angle of 25° 44′ 25″½.

Parallelogram of forces, a term used to designate the parallelogram employed in the fundamental proposition of statics: viz. any two forces having the ratio and the direction of the sides of a parallelogram, have their equivalent or resulting force measured by the diagonal of that parallelogram, and in the direction of it. See Statics.

PARALLELOGRA'MICAL. *a.* (from *parallelogram*.) Having the properties of a parallelogram.

PARALLELOPI'PED. *s.* (*parallelopipede*, Fr.) A solid figure contained under six parallelograms, the opposite of which are equal and parallel; or it is a prism, whose base is a parallelogram: it is always triple to a pyramid of the same base and height (*Newton*).

PA'RALOGISM. *s.* (παραλογισμος.) A false argument (*Arbuthnot*).

PA'RALOGY. *s.* False reasoning (*Brown*).

PARALYSIS. (*paralysis*, παραλυσις; from παραλυω, to loose). The palsy. A genus of disease in the class neuroses, and order comata, of Cullen, known by a loss of the power of voluntary motion, affecting certain parts: species, 1. Paralysis partialis, partial, or palsy of some particular muscles. 2. Paralysis hemiplegica, palsy of one side. 3. Paralysis paraplegica, palsy of one half of the body. Paralysis venenata, from the sedative effects of poisons. Paralysis is also symptomatic of several diseases, as worms, scrophula, syphilis, &c.

PARALYSISHERBA. (*paralysis*, παραλυσις; from παραλυω, to weaken; so called from its use in paralytic disorders). The cowslip and primrose are sometimes so termed. See Primula veris, and Primula vulgaris.

PARALY'TICAL. Paraly'tic. *a.* (from *paralysis*; *paralytique*, Fr.) Palsied; inclined to palsy (*Prior*).

PARAMARIBO, the capital of Surinam, in Guiana, and the chief place of the Dutch colonies in South America. It has a small but strong citadel; and a noble road for shipping, where there are seldom less than 80 vessels loading coffee, sugar, cotton, and indigo. The streets are straight, and lined with orange, shaddock, tamarind, and lemon trees, in continual bloom. It surrendered to the English in 1799, and in 1803. It is situate on the E. side of the river Surinam, 16 miles from its mouth. Lon. 55. 25 W. Lat. 5. 48 N.

PARAMECIUM, in zoology, a genus of the class vermes, order infusoria. Worm invisible to the naked eye, simple, pellucid, flattened, oblong. Seven species, found chiefly in

fresh stagnant water, or infusions, one in salt water. The following are principally entitled to notice.

1. P. aurelia. Compressed, longitudinally plaited towards the fore part, acute behind. Found in ditch waters and infusions; membranaceous; four times as long as it is broad, the fore part obtuse, hyaline, the hind part filled with molecules; the fold reaching from the middle to the tip.

2. P. chrysalis. Cylindrical, longitudinally plaited on the fore part, and obtuse behind. Found in salt water, resembles the last, but is more obtuse behind; the margins filled with black globules.

3. P. acutum. Tail two-edged, head acute. Found in stagnant water, in which duck-weed abounds; slow of motion, continually agitating the tail.

PARAMESE. (Greek.) The name applied by the ancients to the second sound of the second octave, because next in degree to the middle sound of their great system, or diagram. The paramese corresponded with our B above the fifth line in the bass.

PARAMETER, in conic sections, a constant line, otherwise called *latus rectum.* The parameter is said to be constant, because in the parabola, the rectangle under it and any absciss, is always equal to the square of the corresponding semi-ordinate; and in the ellipsis and hyperbola, it is a third proportional to the conjugate and transverse axis.

If t and c be the two axes in the ellipse and hyperbola, and x and y an absciss and its ordinate in the parabola: then

$t:c::c:p=\frac{c^2}{t}=$ the parameter in the former;

$x:y::y:p=\frac{y^2}{x}=$ the parameter in the last.

The parameter is equal to the double ordinate drawn through the focus of one of the three conic sections.

PARAMO (Louis de) a Spanish inquisitor, published at Madrid, 1598, in folio, a rare and curious work upon the tribunal, called The Holy Office. The author wrote with great candour, is exact in his dates, omitting no interesting fact, and enumerating without scruple all the victims who had suffered under the abominable inquisition.

PARAMO'UNT. *a.* (*per* and *mount.*) 1. Superiour; having the highest jurisdiction: as, lord *paramount*, the chief of the seigniory (*Glanville*). 2. Eminent; of the highest order (*Bacon*).

PA'RAMOUNT. *s.* The chief (*Milton*).

PA'RAMOUR. *s.* (*par* and *amour*, Fr.) 1. A lover or wooer (*Spenser*). 2. A mistress (*Shakspeare*).

PARANETE DIEZEUGMENON. (Gr.) The name by which the ancients distinguished the third string of the fourth tetrachord, the tone of which was equivalent to our D under the first line in the treble cliff.

PARANETE HYPERBOLÆON. (Greek.) The name given by the ancients to the penultima of the supreme, or fifth tetrachord. This sound corresponded with our treble-cliff note on the second line.

PARANETE SYNEMMENON. (Greek.) The appellation given by the ancients to the penultima, or last sound but one, of the third tetrachord. This sound corresponded with our C on the first ledger line in the base.

PA'RANYMPH. *s.* (παρα and νυμφη.) 1. A brideman; one who leads the bride to her marriage (*Milton*). 2. One who countenances or supports another (*Taylor*).

PA'RAPEGM. *s.* (παραπηγμ.) A brazen table fixed to a pillar, on which laws and proclamations were anciently engraved; also a table, containing an account of the rising and setting of the stars, eclipses of the sun and moon, the seasons of the year, &c. (*Philips*).

PARAPET, in fortification, an elevation of earth designed for covering the soldiers from the enemies' cannon or small shot. The thickness of the parapet is from eighteen to twenty feet; its height is six feet on the inside, and four or five on the outside. It is raised on the rampart, and has a slope above called the superior talus, and sometimes the glacis of the parapet. The exterior talus of the parapet is the slope facing the country: there is a banquette or two for the soldiers who defend the parapet, to mount upon, that they may the better discover the country, fosse, and counterscarpe, and fire as they find occasion. Parapet of the covert-way, or corridor, is what covers that way from the sight of the enemy, which renders it the most dangerous place for the besiegers, because of the neighbourhood of the faces, flanks, and curtains of the place.

PARAPET is also a little wall raised breast high, on the banks of bridges, keys, or high buildings, to serve as a stay, and prevent people's falling over.

PARAPH, a particular character, knot, or flourish, which people habituate themselves to make always in the same manner at the end of their name, to prevent their signature from being counterfeited.

The paraph of the kings of France was a grate, which the secretaries always placed before their own, in all letters, &c. Menage derives the word from *paragraphus*.

PARAPHERNALIA, or PARAPHERNA, in the civil law, those goods which a wife brought her husband, besides her dower, and which were still to remain at her disposal, exclusive of her husband, unless there was some provision made to the contrary in the marriage-contract.

The word is formed from the Greek παρα, beyond, or over, and φερνὴ, *dos*, dower. *In his rebus quas extra dotem mulier habet, et quas Greci παραφερνα vocant, nullam, uxore prohibente, vir habeat communionem.*

PARAPHIMOSIS. (*paraphimosis*, παραφιμωσις; from παρα, about, and φιμοω, to bind.) In surgery, a disorder in which the prepuce being retracted toward the root of the penis,

cannot be returned over the glans, but makes a sort of ligature behind the corona. This disease is easily known; the glans is uncovered, the skin tumefied on the corona, and above it forms a circular collar or stricture, which, from the skin being unequally extended, becomes indented, and makes several rings round the part. This disease may proceed from two causes; as first from the imprudence of young people, and sometimes also of grown persons, who having the end of their prepuce too straight, cannot uncover their glans without pain, and when they have done it, neglect to return it so soon as they ought; whence the contracted part of the prepuce forms a constriction behind the glans. Soon after, the glans and penis swell, and the prepuce being consequently very much distended, is affected in the same manner; an inflammation seizes upon both, and swellings quickly appear upon the stricture formed by the prepuce, so that the whole may be liable to a gangrene, if not speedily relieved. The second thing that may produce a paraphymosis is a venereal virus. In adults, whose glans is uncovered, there frequently arise venereal chancres in the prepuce after impure coition, which before they digest, are generally attended with inflammation, more or less considerable. This inflammation is alone sufficient to render the prepuce too strait for the size of the penis, in consequence of which a swelling or inosculation may ensue like that before mentioned; and this is what is termed a paraphymosis, or paraphimosis.

PARAPHONIA. (*paraphonia*, παραφωνια; from παρα, wrong, and φωνη, sound). Alteration of the voice. A genus of disease in the class locales, and order dyscinesia of Cullen, comprehending six species, viz. paraphonia puberum, paraphonia rauca, paraphonia resonans, paraphonia palatina, paraphonia clangens, and paraphonia comatosa.

PARAPHRASE, an explanation of some text, in clearer and more ample terms, whereby is supplied what the author might have said or thought on the subject; such are esteemed Erasmus's Paraphrase on the New Testament, the Chaldee Paraphrase on the Pentateuch, &c.

To PA'RAPHRASE. *v. a.* (παραφραζω; *paraphraser*, Fr.) To interpret with laxity of expression; to translate loosely (*Stillingfleet*).

PA'RAPHRAST. *s.* (παραφραστης; *paraphraste*, Fr.) A lax interpreter; one who explains in many words (*Hooker*).

PARAPHRA'STICAL. PARAPHRA'STIC. *a.* (from *paraphrase*) Lax in interpretation; not literal; not verbal.

PARAPHRENITIS. (*paraphrenitis*, παραφρενιτις; from παρα, dim. and φρην, the mind). Diaphragmitis. An inflammation of the diaphragm. A genus of disease in the class pyrexiæ and order phlegmasiæ of Cullen, known by delirium, with difficulty of breathing, and pain in the region of the diaphragm.

PARAPLEGIA. (*paraplegia*, παραπληγια; from παραπλησσω, to strike inharmoniously.) Palsy of one half of the body taken transversely. A species of paralysis. See PARALYSIS.

PARASANG, an ancient Persian measure, different at different times, and in different places; being usually 30, sometimes 40, and sometimes 50 stadia or furlongs. The word, according to Littleton, has its rise from *parasch angarius*, *q. d.* the space a postman rides from one station, *angaria*, to another.

PARASCENIUM, in the Grecian and Roman theatres, was a place behind the scenes whither the actors withdrew to dress and undress themselves. The Romans more frequently called it Postscenium. See THEATRE.

PARASELENE, in natural philosophy, a mock moon; a meteor or phenomenon encompassing or adjacent to the moon, in form of a luminous ring; wherein are observed sometimes one and sometimes two or more images of the moon.

PARASEMON, among the Greeks, was the figure carved on the prow of the ships to distinguish them from each other.

PA'RASITE. *s.* (*parasite*, Fr. *parasita*, Lat.) One that frequents rich tables, and earns his welcome by flattery (*Bacon*).

PARASI'TICAL. PARASI'TIC. *a.* (from *parasite*.) Flattering; wheedling (*Hak.*).

PARASITIC. In zoology. Animals, &c. are so termed, that receive their nourishment in the bodies of others, as worms, polypes, hydatids, &c.

PARASITIC STEM, in botany. Parasitica planta, or plant. Alteri plantæ nec terræ innatus. Growing on some other plant, not on the ground.—As epidendrum, tillandsia.

PA'RASOL. *s.* A small canopy or umbrella carried over the head, to shelter from the heat of the sun.

PARASTATA, in ancient architecture, a kind of pier, or piedroit, serving as a defence or support to a column or arch.

Mr. Evelyn makes the parastata the same with pilaster. Barbaro, and others, the same with anta; and Daviler, the same with piedroit. See PILASTER.

PARASTATÆ, in anatomy. See PROSTATE.

PARATHENAR. (παραθεναρ; from παρα, near, and θεναρ, the sole of the foot). A muscle situated near the sole of the foot.

PARATHENAR MINOR. See FLEXOR BREVIS MINIMI DIGITI PEDIS.

PARATILMUS, in the ancient Greek jurisprudence, a name given to a sort of punishment imposed on adulterers who were poor, and unable to stand the common penalty.

It consisted either in making them run a horse-radish up the anus, which they called αποῤῥαφανιδωσις; or in tearing up by the roots the hair about the pudenda, which they called παρατιλμος, of παρατιλλειν, to tear, pluck up.

PARAZONIUM, παραζωνιον, or Scipio, among medalists, a sceptre, rounded at the two ends in manner of a truncheon, or commander's staff; or a kind of poniard, or short sword, represented as worn at the girdle, on several ancient medals.

Antiquaries are much divided on the explication of the parazonium; as, indeed, the form and manner of bearing it are very different. It is sometimes thrown across the shoulders in manner of a quiver.

To PA'RBOIL. *v. a.* (*parbouiller*, French.) To half boil; to boil in part (*Bacon*).

To PA'RBREAK. *v. n.* (*brecker*, Dutch.) To vomit: obsolete.

PA'RBREAK. *s.* (from the verb.) Vomit (*Spenser*).

PARBUNCLE, in a ship, the name of a rope almost like a pair of slings; it is seized both ends together, and then put almost double about any heavy thing that is to be hoisted in or out of the ship; having the hook of the runner hitched into it, to hoist it up by.

PARCÆ, in mythology, powerful goddesses who presided over the birth and the life of mankind. They were three in number, Clotho, Lachesis, and Atropos, daughters of Nox and Erebus, according to Hesiod, or of Jupiter and Themis, according to the same poet in another poem. Some make them daughters of the sea. Clotho, the youngest of the sisters, presided over the moment in which we are born, and held a distaff in her hand. Lachesis spun out all the events and actions of our life, and Atropos, the eldest of the three, cut the thread of human life with a pair of scissars. The power of the Parcæ was great and extensive. Some suppose that they were subjected to none of the gods but Jupiter, whilst others support that even Jupiter himself was obedient to their commands. According to the more received opinions, they were the arbiters of the life and death of mankind, and whatever good or evil befals us in the world immediately proceeds from the Fates or Parcæ. The worship of the Parcæ was well established in some cities in Greece, and though mankind knew they were inexorable, yet they were eager to raise to them temples and statues. They received the same worship as the Furies, and their votaries yearly sacrificed to them black sheep. The Parcæ were generally represented as three old women, with chaplets made of wool, and interwoven with the flowers of Narcissus. One of them held a distaff, another the spindle, and the third was armed with scissars, with which she cut the thread which her sisters had spun. Their dress is differently represented by some authors. Hyginus and others call them the secretaries of heaven, and the keepers of the archives of eternity.

PA'RCEL. *s.* (*parcelle*, Fr. *particula*, Lat.) 1. A small bundle. 2. A part of the whole; part taken separately (*Arbuthnot*). 3. A quantity or mass (*Newton*). 4. A number of persons: in contempt (*Shakspeare*). 5. Any number or quantity: in contempt.

To PA'RCEL. *v. a.* (from the noun.) 1. To divide into portions (*South*). 2. To make up into a mass (*Shakspeare*).

PARCEL-MAKERS, two officers in the exchequer, who make parcels of the escheator's accounts, in which they charge them with every thing they have levied for the king's use, within the time of their office, and deliver the same to one of the auditors of the court, to make their accounts therewith.

PARCENERS, in law, persons holding lands in copartnership, and who may be compelled to make division. It occurs where lands descend to the females, who all take equal shares of their deceased father's lands.

PARCE'NERY. *s.* (from *parsonier*, Fr.) A holding or occupying of land by joint tenants, called coparceners (*Cowel*).

To PARCH. *v. a.* To burn slightly and superficially; to scorch; to dry up (*Shakspeare*).

To PARCH. *v. n.* To be scorched (*Shakspeare*).

PARCHMENT, in commerce, the skins of sheep or goats, prepared after such a manner as to render it proper for writing upon, covering books, &c. The manufacture of parchment is begun by the skinner, and finished by the parchment-maker. The skin, having been stripped of its wool, and placed in the lime-pit, in the manner described under the article SHAMMY, the skinner stretches it on a kind of frame, and pares off the flesh, with an iron instrument; this done, it is moistened with a rag, and powdered chalk being spread over it, the skinner takes a large pumice-stone, flat at bottom, and rubs over the skin, and thus scowers off the flesh; he then goes over it again with the iron instrument, moistens it as before, and rubs it again with the pumice-stone without any chalk underneath: this smooths and softens the flesh-side very considerably. He then drains it again, by passing over it the iron instrument as before. The flesh-side being thus drained, by scraping off the moisture, he in the same manner passes the iron over the wool or hair side: then stretches it tight on a frame, and scrapes the flesh-side again: this finishes its draining; and the more it is drained, the whiter it becomes. The skinner now throws on more chalk, sweeping it over with a piece of lambskin that has the wool on, and this smooths it still further. It is now left to dry, and when dried, taken off the frame by cutting it all round The skin, thus far prepared by the skinner, is taken out of his hands by the parchment-maker, who first, while it is dry, pares it on a summer, (which is a calf-skin stretched in a frame) with a sharper instrument than that used by the skinner, and working with the arm from the top to the bottom of the skin, takes away about one half of its thickness. The skin thus equally pared on the flesh-side, is again rendered smooth by being rubbed with the pumice-stone, on a bench covered with a sack stuffed with flocon which leaves the parchment in a condition fit for writing upon. The parings thus taken off the leather are used in making glue, size, &c. (See GLUE, &c.) What is called vellum is only parchment made of the skins of abortives, or, at least, sucking calves. This has a much finer grain, and is whiter and smoother than parchment;

but is prepared in the same manner, except its not being passed through the lime-pit.

PARCIEUX, (Anthony de,) a French mathematician. He acquired reputation by his publications, as well as by his lectures, and died universally regretted, 1768. His works are a treatise of trigonometry, 4to.—essays on the probability of the duration of human life, 4to. &c. His nephew, of the same name, was, in 1779, professor of experimental philosophy in the military college of Brienne, and afterwards at the Lyceum at Paris. He was author of Orozio, a tragedy, written when young, and an elementary book on geometrical and astronomical calculations, &c. He died at Paris, 1798.

PARDALIS, in mastiology. See FELIS.

PARDIES (Ignatius Gaston), an ingenious French mathematician and philosopher, was born at Pau, in the province of Gascony, in 1636; his father being a counsellor of the parliament of that city. At the age of 16 he entered into the order of Jesuits, and made so great a proficiency in his studies, that he taught polite literature, and composed many pieces in prose and verse with a distinguished delicacy of thought and style, before he was well arrived at the age of manhood. Propriety and elegance of language appear to have been his first pursuits; for which purpose he studied the belles lettres, and other learned productions. But afterwards he devoted himself to mathematical and philosophical studies, and read, with due attention, the most valuable authors, ancient and modern, in those sciences: so that in a short time he made himself master of the Peripatetic and Cartesian philosophy, and taught them both with great reputation. Notwithstanding he embraced Cartesianism, yet he affected to be rather an inventor in philosophy himself. In this spirit he sometimes advanced very bold opinions in natural philosophy, which met with opposers, who charged him with starting absurdities: but he was ingenious enough to give his notions a plausible turn, so as to clear them seemingly from contradictions. His reputation procured him a call to Paris, as professor of rhetoric in the college of Lewis the Great. He also taught the mathematics in that city, as he had before done in other places. He had from his youth a happy genius for that science, and made a great progress in it; and the glory which his writings acquired him raised the highest expectations from his future labours; but these were all blasted by his early death in 1673, at 37 years of age; falling a victim to his zeal, he having caught a contagious disorder by preaching to the prisoners in the Bicetre.

Pardies wrote with great neatness and elegance. His principal works are as follow:

1. Horologium Thaumaticum duplex; 1662, in 4to.

2. Dissertatio de Motu et Natura Cometarum; 1665, 8vo.

3. Discours du Mouvement Local; 1670, 12mo.

4. Elemens de Geometrie; 1670, 12mo. This has been translated into several languages; in English by Dr. Harris in 1711.

5. Discours de la Connoissance des Betes; 1672, 12mo.

6. Lettre d'un Philosophe à un Cartesien de ses amis; 1672, 12mo.

7. La Statique ou la Science des Forces Mouvantes; 1673, 12mo.

8. Description et Explication de deux Machines propres à faire des Cadrans avec une grande facilité; 1673, 12mo.

9. Remarques du Mouvement de la Lumiere.

10. Globi Cœlestis in tabula plana redacti Descriptio; 1675, folio.

Part of his works were printed together, at the Hague, 1691, in 12mo; and again at Lyons, 1725.—Pardies had a dispute also with sir Isaac Newton, about his New Theory of Light and Colours, in 1672. His letters are inserted in the Philosophical Transactions for that year. (*Hutton's Dictionary*).

To PARDON. *v. a.* (*pardonner*, French.) 1. To excuse an offender (*Dryden*). 2. To forgive a crime (*Dryden*). 3. To remit a penalty (*Shakspeare*). 4. *Pardon me*, is a phrase of civil denial, or slight apology (*Shakspeare*).

PA'RDON. *s.* (*pardon*, French.) 1. Forgiveness of an offender. 2. Forgiveness of a crime (*Milton*). 3. Remission of penalty. 4. Forgiveness received (*South*). 5. Warrant of forgiveness, or exemption from punishment (*Shakspeare*).

PARDON, is the remitting or forgiving a felony or other offence committed against the king. Blackstone mentions the power of pardoning offences to be one of the greatest advantages of monarchy, in general, above every other form of government, and which cannot subsist in democracies. Its utility and necessity are defended by him on all those principles which do honour to human nature.

Pardons are either general or special: general, as by act of parliament, of which, if they are without exceptions, the court must take notice, *ex officio*; but if there are exceptions therein, the party must aver, that he is none of the persons excepted: special pardons, are either of course, as to persons convicted of manslaughter, or *se defendendo*, and by several statutes, to those who shall discover their accomplices in several felonies; or of grace, which are by the king's charter, of which the court cannot take notice, *ex officio*, but they must be pleaded. A pardon may be conditional, that is, the king may extend his mercy upon what terms he pleases; and may annex to his bounty a condition, either precedent or subsequent, on the performance whereof the validity of the pardon will depend; and this by the common law.

All pardons must be under the great seal. The effect of a pardon is to make the offender a new man; to acquit him of all corporal pe-

nalties and forfeitures annexed to that offence, and to give him a new credit and capacity; but nothing but an act of parliament can restore or purify the blood after an attainder.

PA'RDONABLE. *a.* (*pardonable*, Fr.) Venial; excusable (*Dryden*).

PA'RDONABLENESS. *s.* (from *pardonable.*) Venialness; susceptibility of pardon.

PA'RDONABLY. *ad.* (from *pardonable.*) Venially; excusably (*Dryden*).

PA'RDONER. *s.* (from *pardon.*) 1. One who forgives another (*Shakspeare*). 2. A fellow that carried about the pope's indulgencies, and sold them to such as would buy them (*Cowell*).

PARDUBITZ, a town of Bohemia, in the circle of Chrudin, with a fortified castle. It has a manufacture of knives and sword-blades, and stands on the Elbe, 43 miles E. by S. of Prague. Lon. 15. 41 E. Lat. 49. 58 N.

To PARE. *v. a.* To cut off extremities of the surface; to cut away by little and little; to diminish (*Hooker*).

PARE' (Ambrose), an eminent surgeon, born at Laval. Though a protestant, he was surgeon to Henry II. of France, and to his successors; and at the massacre of St. Bartholomew, Charles IX. saved his life by shutting him up in his own closet. He made some useful discoveries in anatomy, and died 1590, at an advanced age. His works were translated into Latin by Guillemeau.

PARE' (David), a protestant divine, born 1548, in Silesia. His step-mother placed him with an apothecary, and afterwards with a shoemaker; but his father recovering to a sense of his duty, permitted him to cultivate literature. By the advice of his master he exchanged his name of Wangler for the Greek word Pareus, and he became theological professor at Heidelberg. The best part of his life was engaged in controversy, in which he displayed learning and moderation. He died 1622, in his pareanum, in the suburbs of Heidelberg. Besides some tracts against the pope, and Bellarmine, he published a commentary on St. Paul's epistle to the Romans, which was condemned by the university of Oxford, and burnt publicly by order of James I.

PARE' (Philip), son to the above, was a grammarian, born at Hembach, 1576. He was rector of the college of Neustadt, and afterwards of Hanau, and died 1650. He wrote Lexicon Criticum, 8vo; Lexicon Plautinum, or a Vocabulary of Plautus' Comedies; Galligraphia Romana, 8vo. &c.

PAREGORICS. (*medicamento paregorica*, παρηγορικος; from παρηγορεω, to mitigate, to assuage.) Medicines that allay pain.

PARENCHYMA. (παρεγχυμα; from παρεγχυω, to strain through, because the ancients believed the blood was strained through it.) In anatomy, the spongy and cellular substance that connects parts together. It is now only, in anatomy, applied to the connecting medium of the substance of the lungs.

PARENCHYMA, in botany, the fleshy substance which lies within the cellular membrane, and surrounds the medulla or pith of plants, and is said to be the chief seat of vegetable irritability. See Wildenow, p. 241.

PARENT, a term of relation applied to those persons from whom we derive our temporal existence.

The moral duties of parents towards their offspring, being a subject too extensive for our plan, we shall not enter into any ethical inquiry, but confine our attention to their legal duties; that is, such as they owe to their legitimate children, respecting their maintenance, education, and protection.

1. With regard to their maintenance, it is a principle both of law and nature, that every man is bound to provide for his offspring. The father and mother, and also the grandsire and grandmother of feeble and poor descendants, are obliged by the 43 Eliz. c. 2, to support them at their own expence (provided they be able), in such manner as shall be directed by the quarter-sessions; and, if a man abscond, and desert his children, the 5 Geo. I. c. 8, directs the churchwardens and overseers of his parish to seize his property, and dispose of it for their relief. Thus, it has been wisely established by these statutes, that if a mother or grandmother, who formerly was able to maintain the child, marry a second time, the step-father becomes chargeable with its maintenance; for, being their debt when single, it extends in common with all others to charge the second husband; but, as the death of the wife dissolves the relation, such duty then ceases to bind him. No person, however, is compellable to support his issue, excepting the latter be incapacitated from labour by infancy, disease, or accident; in which cases the former is obliged to provide them with necessaries, on penalty of paying 20s. per month to the parish, in case of refusal.

Farther, the law of England does not prevent a man from disinheriting his children by will; but, in conformity to the custom of London, the offspring of freemen are entitled to one-third part of their father's effects, which must be equally divided among them, and of which they cannot be deprived. Hence, too, heirs and children are peculiarly protected by courts of justice; lest they should be disinherited by any ambiguous or uncertain expressions; because it is necessary to prove, beyond the possibility of doubt, the testator's intention to deprive them of their right of inheritance.

2. The most important duty of parents is that of educating their children, in a manner becoming their rank in life. And, though it must be confessed that the law of England is deficient in this respect, yet it has also provided for the welfare of the rising generation; as, by the statutes for the apprenticing of poor children, these are to be taken from their parents, and placed by the churchwardens of the parish in such situations, as may render them most useful to the commonwealth.

3. The last duty of parents towards their offspring is protection, which may be considered principally as a natural obligation; no municipal laws enjoining its observance. But, though a child be thus placed in the power of its parent, the latter cannot abuse such authority. He may exercise proper severity to keep his children in due obedience: thus, he may lawfully, and in a reasonable manner, chastise them; because such correction is sometimes necessary, and conducive to their improvement. This authority of the parent, however, extends only to the end of the child's minority, during which period the former is entitled to the benefit of the labour and assistance thus obtained, while the latter resides with, and is maintained by him: a parent may likewise allow or forbid the marriage of his children, till they attain the age of twenty-one years. Now, the legal power of the progenitor ceases; because the adults are enfranchised by arriving at years of discretion, when the empire of the father, or of the guardian, is supposed to yield to that of reason.

PARENT (Anthony), a respectable French mathematician, was born at Paris in 1666. He showed an early propensity to the mathematics, eagerly perusing such books in that science as fell in his way. His custom was to write remarks in the margins of the books he read; and in this way he had filled a number of books with a kind of commentary by the time he was thirteen years of age.

Soon after this he was put under a master, who taught rhetoric at Chartres. Here he happened to see a dodecahedron, upon every face of which was delineated a sun-dial, except the lowest on which it stood. Struck as it were instantaneously with the curiosity of these dials, he attempted drawing one himself: but having only a book which taught the practical part, without the theory, it was not till after his master came to explain the doctrine of the sphere to him, that he began to understand how the projection of the circles of the sphere formed sun-dials. He then undertook to write a treatise upon gnomonics. To be sure the piece was rude and unpolished enough; however, it was entirely his own, and not borrowed. About the same time he wrote a book of geometry, in the same taste, at Beauvais.

His friends then sent for him to Paris to study the law; and in obedience to them he went through a course in that faculty: which was no sooner finished, than, urged by his passion for mathematics, he shut himself up in the college of Dormans, that no avocation might take him from his beloved study: and, with an allowance of less than 200 livres a year, he lived content in this retreat, from which he never stirred but to the Royal College, in order to hear the lectures of M. de la Hire or M. de Sauveur. When he found himself capable of teaching others, he took pupils: and fortification being a branch of mathematics which the war had brought into particular notice, he turned his attention to it; but after some time began to entertain scruples about teaching what he had never seen, and knew only by the force of imagination. He imparted this scruple to M. Sauveur, who recommended him to the marquis d'Aligre, who luckily at that time wanted to have a mathematician with him. Parent made two campaigns with the marquis, by which he instructed himself sufficiently in viewing fortified places; of which he drew a number of plans, though he had never learned the art of drawing. From this period he spent his time in a continual application to the study of natural philosophy, and mathematics in all its branches, both speculative and practical; to which he joined anatomy, botany, and chemistry. His genius managed every thing, and yet he was incessant and indefatigable in his application. M. de Billettes, who was admitted in the academy of sciences at Paris, in 1699, with the title of their mechanician, nominated for his disciple Parent, who excelled chiefly in this branch. It was soon discovered in this society, that he engaged in all the various subjects which were brought before them; and indeed that he had a hand in every thing. But this extent of knowledge, joined to a natural impetuosity of temper, raised in him a spirit of contradiction, which he indulged on all occasions; sometimes to a degree of precipitancy highly culpable, and often with but little regard to decency. Indeed the same behaviour was shown to him, and the papers which he brought to the academy were often treated with much severity. He was charged with obscurity in his productions; and he was indeed so notorious for this fault, that he perceived it himself, and could not avoid correcting it. The king had, by a regulation in 1716, suppressed the class of scholars of the academy, which seemed to put too great an inequality betwixt the members. Parent was made a joint or assistant member for geometry: but he enjoyed this promotion but a short time; for he was taken off by the small-pox the same year, at the age of 50. He was author of a great many pieces, chiefly on mechanics and geometry.

PA'RENTAGE. *s.* (from *parent.*) Extraction; birth; condition with respect to the rank of parents (*Shakspeare*).

PARE'NTAL. *a.* (from *parent*) Becoming parents; pertaining to parents (*Brown*).

PARENTA'TION. *s.* (from *parento*, Lat.) Something done or said in honour of the dead.

PARE'NTHESIS. *s.* (*parenthese*, French. παρα, εν and τιθημι.) A sentence so included in another sentence, as that it may be taken out without injuring the sense of that which encloses it: commonly marked thus ( ) (*Watts*).

PARENTHE'TICAL. *a.* (from *parenthesis.*) Pertaining to a parenthesis.

PARENZA, a seaport of Istria, on a peninsula in the gulf of Venice, with a harbour for large vessels. It is 28 miles S. by W. of Capo d'Istria. Lon. 13. 50 E. Lat. 45. 18 N.

PA'RER. *s.* (from *pare.*) An instrument to cut away the surface (*Tusser*).

PA'RERGY. *s.* (παρα and εργον.) Something unimportant; something done by the by (*Brown*).

PARESIS. (παρεσις; from παριημι, to relax.) An imperfect palsy.

PA'RGET. *s.* Plaster laid upon roofs of rooms (*Woodward*).

To PA'RGET. *v. a.* (from the noun.) To plaster; to cover with plaster (*G. of Tongue*).

PARGETING, in building, is used for the plastering of walls, and sometimes for plaster itself. Pargeting is of various kinds: as, 1. White-lime and hair-mortar laid on bare walls. 2. On bare laths, as in partitioning and plain ceiling. 3. Rendering the insides of walls, or doubling partition walls. 4. Rough-casting on heart-laths. 5. Plastering on brick-work, with finishing mortar, in imitation of stone-work; and the like upon heart-laths.

PARHELION, or PARHELIUM. (formed from παρα, near, and ηλιος, sun.) In natural philosophy, a mock-sun or meteor, in form of a very bright light appearing on one side of the sun. Appearances of this kind have been made mention of both by the ancients and moderns. Aristotle observes, that in general they are seen only when the sun is near the horizon, though he takes notice of two that were seen in Bosphorus from morning to evening; and Pliny has related the times when such phenomena were observed at Rome. Gassendi says, that in 1635 and 1636, he often saw one mock-sun. Two were observed by M. de la Hire in 1689; and the same number by Cassini in 1693, Mr. Grey in 1700, and Dr. Halley in 1702: but the most celebrated appearances of this kind were seen at Rome by Scheiner, by Muschenbroeck at Utrecht, and by Hevelius at Sedan. By the two former, four mock-suns were observed, and by the latter seven.

Parhelia are apparently of the same size with the sun, though not always of the same brightness, nor even of the same shape; and when a number appear at once, there is some difference in both these respects among them. Externally they are tinged with colours like the rainbow; and many have a long fiery tail opposite to the sun, but paler towards the extremity. Parhelia are generally accompanied with coronas, some of which are tinged with rainbow colours, but others are white. They differ in number and size; but all agree in breadth, which is that of the apparent diameter of the sun.

A very large white circle, parallel to the horizon, generally passes through all the parhelia; and, if it were entire, it would go through the centre of the sun. Sometimes there are arcs of lesser circles concentric to this, touching those coloured circles which surround the sun. They are also tinged with colours, and contain other parhelia. There are also said to have been other circles obliquely situated with respect to all those we have mentioned: but of this we have met with no authentic account. The order of the colours in these circles is the same as in the rainbow; but on the inside, with respect to the sun, they are red, as is also observed in many other coronas.

Dr. Thomas Young has recently proposed a new theory of both halos and parhelia, as follows:

The explanation of the primary and secondary rainbow, begun by de Dominis, and completed by Descartes and Newton, derives an entire and satisfactory confirmation from the perfect coincidence of the observed angular magnitudes, with the result of calculations of the effect of spherical drops. We know that drops of water, either accurately, or very nearly spherical, exist in great abundance in every cloud, and in every shower of rain; and whatever their dimensions may be, they must necessarily conspire in the same general effect of producing the same rainbow, whenever a spectator is placed in a proper situation for observing it; consequently such rainbows are of very frequent occurrence.

Dr. Young has attempted to show, that for producing the phenomena of variable halos, often observable in hot climates, it is only necessary that a considerable part of the spherules of a cloud or mist be either accurately, or very nearly, of equal magnitude, a condition, of which the possibility is easily admitted from analogy, and the probability is favoured by the apparent uniformity of the different parts of such mists as we can examine.

But no satisfactory reason has hitherto been assigned for the production of the halo, which in these climates is the most common of all; that is, the constant halo of 23° or 24°. The hypothesis by which Huygens attempted to explain the production of halos and parhelia, are both arbitrary and improbable. He imagined the existence of particles of hail, some globular, others cylindrical, with an opaque part in the middle of each, bearing a certain ratio to the whole; and he supposed the position of the cylinders to be sometimes vertical, and sometimes inclined to the horizon in a given angle.

It has already been objected, that no such particles have ever been observed to accompany halos; and it is, besides, highly improbable, that such an opaque part should bear the same proportion in all the hailstones, and that the cylinders should have terminations so peculiar as is supposed; and the most incredible circumstance of all is, that all these proportions should be constantly such, as always to produce a halo at the distance of 23° or 24° from the sun or moon.

It appears that a much simpler and more natural explanation of these phenomena may be deduced from the regular crystallization of snow in the atmosphere.

It is well known, that the crystals of ice and snow tend always to form angles of 60°; now a prism of water or ice, of 60°, produces a deviation of 23° 37′, for rays forming equal angles with its surfaces, and the angle of deviation varies at first very slowly, as the inclination

changes, the variation amounting to less than 3°, while the inclination changes 30°.

Now if such prisms were placed at all possible angles of inclination, differing equally from each other, one half of them would be so situated, as to be incapable of transmitting any light regularly by two successive refractions directed the same way; and of the remaining two-fourths, the one would refract all the light within these three degrees, and the other would disperse the light in a space of between 20° and 30° beyond them.

In the same manner we may imagine an immense number of prismatic particles of snow to be disposed in all possible directions, and a considerable proportion of them to be so situated, that the plane of their transverse section may pass within certain limits of the sun and the spectator. Then half of these only will appear illuminated, and the greater part of the light will be transmitted by such as are situated at an angular distance of 23° 37′, or within 3° of it: the limit being strongly marked internally, but the light being externally more gradually lost. And this is precisely the appearance of the most common halo. When there is a sufficient quantity of the prismatic particles, a considerable part of the light must fall, after one refraction, on a second particle; so that the effect will be doubled: and, in this case, the angle of refraction will become sufficient to present a faint appearance of colour, the red being internal, as the least refrangible light, and the external part having a tinge of blue.

These concentric halos of 23½° and 47° are therefore sufficiently explicable, by particles of snow, situated promiscuously in all possible directions. If the prisms be so short as to form triangular plates, these plates, in falling through the air, will tend to assume a vertical direction, and a much greater number of them will be in this situation than in any other. The reflection from their flat surfaces will consequently produce a horizontal circle of equal height with the sun; and their refraction will exhibit a bright parhelion immediately over the sun, with an appearance of wings, or horns, diverging upwards from the parhelion.

For all such particles as are directed nearly towards the spectator, will conspire in transmitting the light much more copiously than it can arrive from any other part of the circle; but such as are turned more obliquely will produce a greater deviation in the light, and at the same time a deflection from the original vertical plane. This may be easily understood, by looking at a long line through a prism, held parallel to it: the line appears, instead of a right line, to become a curve, the deviation being greater in those rays that pass obliquely with respect to the axis of the prism; which are also deflected from the plane in which they were passing.

The line viewed through the prism has no point of contrary flexure, but if its ordinates were referred to a centre, as in the case of the halos, it would assume a form similar to that which parhelia frequently assume.

The form of the flakes of snow as they usually fall is indeed more complicated than we have been supposing, but their elements in the upper regions of the air are probably more simple. The coincidence in the magnitude of the observed and calculated angles is so striking, as to be nearly decisive with respect to halos, and it is not difficult to imagine that many circumstances may exist, which may cause the axis of the greater number of the prisms to assume a position nearly horizontal, which is all that is required for the explanation of the parhelia with their curved appendages. Perhaps also, the effect may sometimes be facilitated by the partial melting of the snow into conoidal drops: for it may be shown, by the light of a candle transmitted through a wine glass full of water, that such a form is accommodated to the production of an inverted arch of light, like that which is frequently observed to accompany a parhelion.

PARIA, or New Andalusia, a province of Terra Firma, in the government of Caraccas, lying to the S.E. of Cumana, on the banks of the Oronoko, and including the delta of the river. On the N. of this province, between Cumana and the island of Trinidad, is a large bay called the Gulf of Paria.

PARIAN CHRONICLE. See Arundelian marbles.

PARIANA. In botany, a genus of the class monœcia, order polyandria. Male: flowers in whorls, forming spikes; calyx two-valved; corol two-valved, larger than the calyx; stigmas two; seeds three-sided, inclosed. One species: a Cayenne plant.

PARIAS, or Perreas, a tribe of Hindus, so peculiarly distinguished from all others, that they live by themselves in the out-skirts of towns; and, in the country build their houses apart from the villages, or rather have villages of their own, furnished with wells; for they dare not so much as fetch water from those which other families make use of; and, lest these latter should inadvertently go to one of theirs, they are obliged to scatter the bones of dead cattle about their wells, that they may be known. They dare not in cities pass through the streets where the Bramins live; nor set foot in the villages where they dwell. They are likewise forbidden to enter a temple, either of their god Wistnow or Eswara; because they are held impure. They get their bread by sowing, digging, and building the walls of mud-houses; most of those inhabited by the common people being raised by these Parias, who also do such kinds of dirty work as other people do not care to meddle with. Nor is their diet much more cleanly.

PARIERA BRAVA. (*pariera*, Span.) The root of this plant, cissampelos pareira, foliis pellatis cordatis emarginatis of Linnéus. C. O. Dioecia. Monadelphia. A native of South America and the West Indies, has no

remarkable smell, but to the taste it manifests a notable sweetness of the liquorice kind, together with a considerable bitterness, and a slight roughness covered by the sweet matter. The facts adduced on the utility of the radix pareiræ bravæ in nephritic and calculous complaints are principally mentioned by foreigners, and no remarkable instances of its efficacy are recorded by English practitioners.

PARIETAL BONES. (*parietalis*, from *paries*, a wall, because they defend the brain like walls.) Ossa verticis. Ossa syncipitis. Ossa verticalia vel bregmatis. Two arched and somewhat quadrangular bones, situated one on each side of the superior part of the cranium. Each of these bones forms an irregular square. They are thicker above than below; but are somewhat thinner, and at the same time more equal and smooth than the other bones of the cranium. The only foramen we observe in them is a small one towards the upper and posterior part of each. It has been named the parietal foramen, and serves for the transmission of a small vein to the longitudinal sinus. In many subjects this foramen is wanting. On the inner surface of these bones are the marks of the vessels of the dura mater, and of the convoluted surface of the brain. On the inside of their upper edge we may likewise observe a considerable furrow, which corresponds with the longitudinal sinus of the dura mater; and lower down, towards their posterior and inferior angle, is a smaller one for part of the lateral sinuses. These bones are joined to each other by the sagittal suture; to the os sphenoides, and ossa temporum, by the squamous suture; to the os occipitis by the lambdoidal suture; and to the os frontis by the coronal suture. Their connection with this latter bone is well worthy our attention. We shall find, that in the middle of the suture, where the os frontis, from its size and flatness, is the most in danger of being injured, it rests upon the arch formed by the parietal bones; whereas at the sides, the parietal bones are found resting upon the os frontis, because this same arch is there in the greatest danger from pressure. In new-born infants, the ossa parietalia are separated from the middle of the divided os frontis by a portion of the cranium, then unossified. When the finger is applied to this part, the motion of the brain, and the pulsation of the arteries of the dura mater, may be easily distinguished. In general, the whole of this part is completely ossified before we are seven years of age.

PARIETARIA. Pellitory. In botany, a genus of the class polygamia, order monoecia. Herm.: calyx four-cleft; stamens four; style one; seed one, superior, covered with the elongated calyx. Fem.: stamenless. Ten species; chiefly of the Cape, India, and south of Europe: one, P. officinalis, common to the walls of our own country.

The only cultivated species is P. arboreum, tree pellitory, a soft upright shrub of a man's height, with red shoots, villose with hoary hairs; flowers commonly three, clustered, from the axil of each bracte, sessile; in the male yellow, in the female red, herbaceous. A native of the Canaries.

PA'RING. *s.* (from *pare*.) That which is pared off any thing; the rind (*Pope*).

Paring, in farriery, an operation performed on a horse's foot with a view to adapt it to the shoe. This is done with a butteris, and frequently to the great prejudice of the foot. The original design of shoeing horses was undoubtedly intended as a preservation of the hoof, and a defence of the sole; but no one could think it necessary to pare away what he wanted to preserve by the use of shoes, because that would be to act contrary to his first principles, and destroy his own work. This preparation should never be permitted, but in cases where the horny sole is uneven, insomuch that the shoe will not otherwise bear equally upon the foot, which would take off from its necessary firmness. In such a case, perhaps, it may be reasonable, otherwise it must be very absurd and injurious. The farrier usually holds the horse's foot between his knees, in which posture he pares the foot, sets on the shoe, drives the nails, and rivets them; and all this without any assistance.

Paring, in husbandry, a particular process for clearing the soil of weeds and rendering it more productive. See Husbandry.

PARIS, the son of Priam, king of Troy, by Hecuba, also called Alexander, was destined, even before his birth, to become the ruin of his country. When his mother, in her pregnancy, had dreamed she should bring forth a torch, which would set fire to her palace, the soothsayers foretold her offspring would prove the destruction of Troy. Priam, to prevent so great an evil, ordered his slave Archelaus to destroy the child as soon as born. The slave, touched with humanity, did not destroy him, but exposed him on mount Ida, where the shepherds found him, and educated him as their own. Paris, though educated among shepherds, gave early proofs of courage, and from his care in protecting the flocks of mount Ida against the wild beasts, he obtained the name of Alexander (helper or defender). Here he gained the favour of Œnone, a nymph of Ida, whom he married, but their conjugal peace was soon disturbed. At the marriage of Peleus and Thetis, the goddess of discord, not being invited to the entertainment, showed her displeasure, by throwing among the gods, at the celebration of the nuptials, a golden apple, on which were written the words *Detur pulchriori*. All the goddesses claimed it as their own, but Juno, Venus, and Minerva, only wished to dispute the right to the apple. The gods then appointed Paris to adjudge the prize of beauty to the fairest of the goddesses. The goddesses appeared before their judge without any ornament, and each tried by promises, &c. to influence his judgment. Juno promised him a kingdom; Minerva, military glory; and Venus, the fairest woman in the

world for his wife. Paris at length adjudged the prize to Venus. This decision of Paris in favour of Venus drew upon the judge and his family the resentment of the two other goddesses. From some subsequent circumstances, the birth and the manner of preservation of Paris were discovered, and Priam finally acknowledged him as his son, forgetful of the alarming dreams which had influenced him to meditate his death. Paris then equipped a fleet, as if willing to redeem Hesione, whom Hercules had carried away and obliged to marry Telamon. This was the pretended motive of his voyage. He recollected that he was to have Helen, the fairest woman of the age, whom Venus had promised him. On these grounds he visited Sparta, the residence of Helen, who had married Menelaus, and was received kindly, but he abused the hospitality of Menelaus, and while he was absent in Crete, Paris carried off Helen, and Priam received her into his palace. This affair was soon productive of serious sonsequences. When Menelaus had married Helen, all her suitors had bound themselves by a solemn oath to defend her from every violence (see HELENA), and therefore her husband reminded them of their engagements. Upon this, all Greece took up arms. Agamemnon was chosen general of the combined forces, and a regular war was begun. (See TROJA.) Paris, meanwhile, armed himself with his brothers to oppose the enemy. He fought with little courage, and at the sight of Menelaus he retired from the front of the army. In a combat with Menelaus, he must have perished, had not Venus stolen him from the resentment of his adversary. He nevertheless wounded in another battle Machaon, Euriphilus, and Diomedes, and according to some, killed the great Achilles. (See ACHILLES.) The death of Paris is differently related. Some say he died by one of the arrows of Philocretes, which had been once in the possession of Hercules.

PARIS (Matthew), one of our best historians from William the Conqueror to the latter end of the reign of Henry III. but of his life few particulars have been transmitted to us. Leland, his original biographer, without determining whether he was born in France or England, informs us, that he was a monk of St. Alban's, and that he was sent by pope Innocent to reform the monks of the convent at Holm in Norway. Bishop Bale, the next in point of time, adds to the above relation, that, on account of his extraordinary gifts of body and mind, he was much esteemed, particularly by king Henry III. who commanded him to write the history of his reign. Fuller makes him a native of Cambridgeshire, because there was an ancient family of his name in that county. He also mentions his being sent by the pope to visit the monks in the diocese of Norwich. Bishop Tanner, bishop Nicholson, doctor du Pin, and the Noveau Dictionnaire Historique, add not a single fact to those above related. Matthew Paris died in the monastery of St. Alban's in the year 1259. He was doubtless a man of extraordinary knowledge for the 13th century; of an excellent moral character, and, as an historian, of strict integrity. His style is unpolished; but that defect is sufficiently atoned for by the honest freedom with which he relates the truth, regardless of the dignity or sanctity of the persons concerned. His works are, 1. Historia ab Adamo ad Conquestum Angliæ, lib. i. manuscript. col. C. C. Cantab. c. ix. Most of this book is transcribed, by Matthew of Westminster, into the first part of his Florilegium. 2. Historia major, seu rerum Anglicanorum historia a Gul. Conquestoris adventu ad annum 43 Henrici III. &c. several times printed. The first part of this history, viz. to the year 1235, is transcribed almost verbatim from the Chronicle of Roger Wendover; and the Appendix, from the year 1260, is the work of William Rashinger, who was also a monk of St. Alban's. 3. Vitæ duorum Offarum, Merciæ regum, S. Albani fundatorum. 4. Gesta 22 addatum S. Albani. 5. Additamenta chronicorum ad hist. majorem; printed. 6. Historia minor, sive epitome majoris historiæ; manuscript. Besides many other things in manuscript.

PARIS, a city and the capital of France, the see of an archbishop, and the seat of a university. The river Seine, which crosses it, forms two small islands, called Isle du Palais and Isle Notre Dame; the first is the ancient city of Paris, and had its name from a building which was formerly the residence of the kings, and afterwards resigned to the parliament. Paris has 16 gates, and is 15 miles in circumference, including the suburbs. That part of it which is called the ville is situate to the north, the university to the south, and the city in the centre. The streets are narrow, and generally without accommodation for foot passengers. The houses are built of freestone, many of them seven stories high, and often contain a different family on every floor. The number of inhabitants, by a late official statement, is 546,856. There are nine principal bridges in Paris, but only three of them occupy the whole breadth of the Seine, which is not half so large as the Thames at London. There are a great number of public fountains, and some triumphal arches. Of the squares, the finest is the Place de Louis Quinze, of an octagon form, in which was an equestrian statue, in bronze, of that monarch. This square, now called the Place de la Revolution, was the fatal scene of the execution of Louis XVI. and of his consort Marie Antoinette, and of his sister the princess Elisabeth. Besides the cathedral of Notre Dame, one of the largest in Europe, Paris has many fine churches. The abbey of St. Genevieve was founded by king Clovis, whose monument is still to be seen in the church: it has a library of 24,000 printed books and 2000 manuscripts, also a valuable cabinet of antiquities and natural curiosities. The new church of St. Genevieve (now called the Pantheon) was destined by the national assembly, in 1791, to receive the remains of such great men as had merited well of their country.

The Bastile, built as a fortress by Charles V. lately served for a state prison; but it was destroyed by the people, in the beginning of the revolution. The university, founded by Charles the fat, consists of four faculties; namely, divinity, the civil and canon law, physic, and the sciences: its head is the rector, who is always chosen from the faculty of the sciences. The finest college in Paris is that of the Four Nations, called also Mazarin, from the cardinal, its founder. Among the public libraries, that lately called the royal holds the first rank, in respect both to the extent of the buildings, and the number of volumes. The royal observatory is built of freestone, and neither iron nor wood has been employed in the erection. The botanical garden is worthy of its appellation of royal. The four principal palaces are the Louvre, the Thuileries, the Palais Royal, and the Luxemburg. In the Louvre is deposited the finest collection of paintings and statues in the world; the principal of them lately brought from various parts of Italy. The garden of the Thuileries, in front of the palace and on the banks of the Seine, is the finest public walk in Paris. The Palais Royal was long the property of the dukes of Orleans; and the interior courts have been embellished with many beautiful buildings, with shops, coffeehouses, and a garden, which render it like a perpetual fair. The Luxemburg is famous for its gallery, in which are twenty exquisite paintings by Rubens. The Hospital-general, which also goes by the name of la Salpatreria (saltpetre being formerly made here), is a most noble foundation for the female sex; near 7000 of whom are here provided for, and live under the inspection of sixty sisters. To this incomparable foundation belongs the castle of Bicestre, defended on all sides by a wall, of considerable circuit, which contains within it many large buildings and several open places; and here near 4000 persons of the other sex are maintained. The Hospital de la Pietie, where poor children are brought up, constitutes also a part of the Hospital-general. These three foundations, with the Hotel Dieu, have one common fund, amounting to full two millions of livres a year. The Hotel des Invalides, for the wounded and superannuated soldiery, built by Lewis XIV. is a magnificent structure; as is the military school in the Champ de Mars, founded by Lewis XV. The two principal theatres are the Theatre de la Nation and the Italian theatre; which, in point of elegance and convenience, are worthy of the capital of a great nation. The Monnoie, or mint, is also a noble building, situate on that side of the Seine, opposite the Louvre. The Samaritan is a beautiful edifice, at the end of the bridge leading to the Louvre, and contains an engine for conveying the water of the Seine to all the parts of the villa. The Hotel de Ville is an ancient structure; this tribunal stands in the Place de Greve, where all public rejoicings are celebrated, and common malefactors executed. The most interesting of the manufactures of Paris is plate-glass, and tapestries made after the pictures of the greatest masters. In the environs are excellent freestone and abundance of gypsum. Paris now forms, with a small district round it, one of the departments of France. It is 210 miles S.S.E. of London, 625 W. of Vienna, and 630 N.N.E. of Madrid. Lon. 2. 20 E. Lat. 48. 50 N.

Paris, a town of Kentucky, chief of Bourbon county, situate in a fine plain, watered by a small river, 30 miles E. of Frankfort.

Paris (Department of), one of the new divisions of France, including the city of Paris, and its immediate environs.

Paris. Herb-Paris, or true-love. In botany, a genus of the class octandria, order tetragynia. Calyx four-leaved; petals four, narrower than the calyx; berry superior, four-celled; anthers growing to the middle of the filaments. One species: P. quadrifolia, indigenous to the woods of our own country. The colour and smell of this plant indicate its possessing narcotic powers. The leaves and berries are said to be efficacious in the cure of hooping cough, and to act like opium. Great caution is requisite in their exhibition, as convulsions and death are caused by an overdose. The root possesses emetic qualities.

Paris (Plaster of). See Plaster.

PARISH, the precinct of a parochial church, or a circuit of ground inhabited by people who belong to one church, and are under the particular charge of its minister. The word comes from the Latin *parochia*, the Greek παροικια, habitation; compound of παρα, near, οικος, house. Accordingly Du Cange observes, that the name παροικια was anciently given to the whole territory of a bishop, and derives it from neighbourhood; because the primitive christians not daring to assemble openly in cities, were forced to meet secretly in neighbour-houses.

In the ancient church there was one large edifice in each city for the people to meet in; and this they called *parochia*, parish. But the signification of the word was afterwards enlarged, and by a parish was meant a diocese, or the extent of the jurisdiction of a bishop, consisting of several churches; unless we will suppose, as some do, that those bishops were only pastors of single churches. Du Pin observes, that country parishes had not their origin before the 4th century; but those of cities are more ancient. The city of Alexandria is said to have been the first that was divided into parishes.

It seems pretty clear and certain, says judge Blackstone (Com. vol. i. p. 112), that the boundaries of parishes were first ascertained by those of a manor or manors; because it very seldom happens that a manor extends itself over more than one parish, though there are often many manors in one parish. The lords, he adds, as christianity spread, began to build churches upon their own demesnes or wastes, in order to accommodate their tenants in one or two adjoining lordships; and that they might have divine service regularly performed therein, obliged all their tenants to appropriate their tithes to the maintenance of the one officiating

minister, instead of leaving them at liberty to distribute them among the clergy of the diocese in general; and this tract of land, the tithes of which were so appropriated, formed a distinct parish; and this accounts for the frequent intermixture of parishes one with another. For if a lord had a parcel of land detached from the main of his estate, but not sufficient to form a parish of itself, it was natural for him to endow his newly erected church with the tithes of such lands. Extra parochial wastes and marsh land, when improved and drained, are by 17 Geo. II. cap. 37. to be assessed to all parochial rates in the parish next adjoining. Camden reckons 9284 parishes in England; and Chamberlayne makes 9913. They are now generally reckoned nearly 11,000. See BENEFICE and NON-RESIDENT.

PARISH-CLERK. In every parish the parson, vicar, &c. hath a parish-clerk under him, who is the lowest officer of the church. These were formerly clerks in orders, and their business at first was to officiate at the altar; for which they had a competent maintenance by offerings; but they are now laymen, and have certain fees with the parson on christenings, marriages, burials, &c. besides wages for their maintenance. The law looks upon them as officers for life: and they are chosen by the minister of the parish, unless there is a custom for the parishioners or church-wardens to choose them; in which case the canon cannot abrogate such custom; and when chosen, it is to be signified, and they are to be sworn into their office by the archdeacon, for which the court of king's bench will grant a mandamus.

PA'RISH. *a.* 1. Belonging to the parish; having the care of the parish (*Ayliffe*). 2. Maintained by the parish (*Gay*).

PARI'SHIONER. *s.* (*paroissien*, French, from *parish*.) One that belongs to the parish.

PARISTHMIA. (παρα, near, and ισθμιο, the tonsils and their vicinity.) In medicine, a disease of the tonsils; a quincy.

PA'RITOR. *s.* (for *apparitor*.) A beadle; a summoner of the courts of civil law (*Dryd.*).

PA'RITY. *s.* (*parité*, Fr. *paritas*, Latin.) Equality; resemblance (*Hall*).

PARIUM, a noble city of Mysia Minor, with a port on the Propontis; called Adrastia by Homer, according to Pliny; but Strabo distinguishes them: according to others, the Paestos of Homer. Pariani, the people (*Strabo*). The birthplace of Neoptolemus surnamed Glossographus (*Strabo*). Here stood a Cupid equal in exquisite workmanship to the Cnidian Venus.

PARK, an extensive tract of ground, or country, enclosed with wall or paling, well variegated with wood and water, for the support of cattle, and preservation of venison and game. It becomes a park by the privilege of prescription, or by the king's grant. There are many parks in possession of the crown (as well as of opulent individuals), of all which Windsor great park is the largest in the kingdom. It is upon record, that the park of Woodstock was the first in England, formed and enclosed about the year 1124, and bounded by a stone wall seven miles in circumference. The example was followed by Henry Earl of Warwick; after which park-making became a common practice in different parts of the country.

To a park three things are required. 1. A grant thereof. 2. Inclosure by pale, wall, or hedge. 3. Beasts of a park; such as the buck, doe, &c. And where all the deer are destroyed, it shall no more be accounted a park; for a park consists of vert, venison, and inclosure; and if it is determined in any of them, it is a total disparking. Parks as well as chases are subject to the common law, and are not to be governed by the forest laws.

PARK LEAVES. In botany. See HYPERICUM.

PARK OF ARTILLERY. See ARTILLERY.

To PARK. *v. a.* (from the noun.) To enclose as in a park (*Shakspeare*).

PA'RKER. *s.* (from *park*.) A park keeper.

PARKER (Matthew), archbishop of Canterbury, was born at Norwich and educated at Cambridge, being first bible clerk or scholar, and afterwards fellow of Corpus Christi college in that university. He was chaplain to queen Anne Boleyne, who afterwards preferred him to the deanery of Stoke; afterwards he became chaplain to Henry VIII. and Edward VI. He was chosen master of his college to which he was a benefactor. By queen Mary he was deprived of all his preferments. In his retirement he wrote A Defence of the Marriage of Priests. On the accession of queen Elizabeth, he was consecrated archbishop of Canterbury. He solicited the queen to remove the crucifixes, lighted tapers, and images out of the churches, and particularly out of her own chapel. He improved the English translation of the bible, and had it printed on a larger paper, and dispersed through the kingdom. This is called the bishop's bible. He died in 1575, in his 72d year.

PARKER (Samuel), an English bishop, was born at Northampton in 1640, and lived at Wadham college, Oxford. He sided with the prevalent party after the example of his father, who having been bred to the law was made a member of the high court of justice in 1649, where he gave sentence against the lords Capel, Holland, and Hamilton, who were beheaded. During the protectorate he was made an assistant committee man for his county. In 1650, he published a treatise in defence of the new government as a commonwealth, without a king or house of lords, and was appointed by the rump parliament one of the barons of the exchequer; notwithstanding which, on the return of Charles II. he obtained a regular call as serjeant at law by the recommendation of chancellor Hyde. The son, Samuel, the subject of this article, had been bred among puritans, and entered into the society of Gruellers, a name given them for their constant fasting and praying. Upon the restoration, he became a zealous anti-puritan; and in the reign of James

II. he obtained the bishopric of Oxford. After this he was made a privy counsellor, and constituted by a royal mandamus president of Magdalen college, Oxford. He purchased these favours by complying with the king's commands, and writing some pieces which favoured the popish doctrine of transubstantiation and saint worship. He died in 1687.

PARKER (Henry, Lord Morley), in Henry the eighth's time was one of the barons who signed the memorable letter to Clement VII. threatening him with the loss of his supremacy in England, unless he proceeded to dispatch the divorce of the king. A list of his works may be seen in Mr. Walpole's (lord Orford's) Catalogue of royal and noble Authors, vol. 1.

PARKHURST (John), a learned English divine, was the second son of John Parkhurst, Esq. of Catesby-house, Northamptonshire. He was born in June, 1728, and educated first at Rugby, then at Clare-Hall, Cambridge, of which, in 1751, he was admitted fellow. He took his degrees in arts; and afterwards settled at Epsom, in Surrey. Mr. Parkhurst was the intimate friend of bishop Horne, and like him had a great partiality to the opinions of Hutchinson. He published a Greek and English Lexicon, 4to.; a Hebrew and English Lexicon, 4to.; and an answer to Dr. Priestley on the pre-existence of Christ. His Lexicons now published in 8vo. are very useful. He died in February, 1797. An interesting account of Mr. Parkhurst's life is prefixed to the later editions of his Greek Lexicon; from which we transcribe the following anecdote; as it shews the high sense he entertained of strict justice, and the steady resolution with which he practised it. One of his tenants falling behindhand in the payment of his rent, which was 500l. per annum, it was represented to Mr. Parkhurst that it was owing to his being over-rented. This being believed to be the case, a new valuation was made: it was then agreed that, for the future, the rent should not be more than 450l. Justly inferring, moreover, that, if the farm was then too dear, it must necessarilly have been always too dear; unasked, and of his own accord, he immediately struck off 50l. from the commencement of the lease; and instantly refunded all that he had received more than 450l. per annum.

PARKINSON (John), an English botanist, born in 1567. He was the first who singly described and figured the subjects of the flower garden. His Theatrum Botanicum contained a more copious history of physical herbs than any former publication: but his first work had a title which exhibited a pun or witticism upon his own name; it was called Paridisi in sole, Paradisus terrestris. Paradisus in sole meaning *Park-in-sun.*

PARKINSONIA. In botany, a genus of the class decandria, order monogynia. Calyx five-cleft; petals five, ovate, the lowermost kidney-form; styleless; legume moniliform. One species only; an American tree about twenty feet high, with prickly branches; long, linear, pinnate leaves; flowers yellow on slender branches, of a most delightful scent.

PARLE. *s.* (from *parler*, French.) Conversation; talk; oral treaty (*Daniel*).

To PA'RLEY. *v. a.* (from *parler*, French.) To treat by word of mouth; to talk; to discuss any thing orally (*Broome*).

PA'RLEY. *s.* (from the verb.) Oral treaty; talk; conference; discussion by word of mouth (*Prior*).

PARLIAMENT, the grand assembly of the three estates of this kingdom, summoned together by the king's authority, to consider of matters relating to the public welfare, and particularly to enact and repeal laws.

The original or first institution of parliament is one of those matters which lie so far hidden in the dark ages of antiquity, that the tracing of it out is a thing equally difficult and uncertain. The word parliament itself (or colloquium, as some of our historians translate it) is, comparatively, of moderate date; derived from the French, and signifying "the place where they met and conferred together." It was first applied to general assemblies of the states under Louis VII. in France, about the middle of the 12th century. But it is certain, that, long before the introduction of the Norman language into England, all matters of importance were debated and settled in the great councils of the realm: a practice which seems to have been universal among the northern nations, particularly the Germans; and carried by them into all the countries of Europe, which they over-ran at the dissolution of the Roman empire, relics of which constitution, under various modifications and changes, are still to be met with in the diets of Poland, Germany, and Sweden, and lately in the assembly of the estates in France: for what was there called the parliament was only the supreme court of justice, consisting of the peers, certain dignified ecclesiastics, and judges; which neither was in practice, nor was supposed to be in theory, a general council of the realm.

In England, however, this general council hath been held immemorially, under the several names of *michel-synoth*, or great council; *michel-gemote*, or great meeting; and more frequently *wittena-gemote*, or the meeting of wise men. It was also styled in Latin, *commune concilium regni; magnum concilium regis, curia magna, conventus magnatum vel procerum, assisa generalis*, and sometimes *communitas regni Angliæ*. We have instances of its meeting to order the affairs of the kingdom, to make new laws, and to amend the old, or, as Fleta expresses it, *novis injuriis emersis nova constituere remedia*, so early as the reign of Ina king of the West Saxons, Offa king of the Mercians, and Ethelbert king of Kent, in the several realms of the heptarchy. And after their union, the Mirrour informs us, that king Alfred ordained for a perpetual usage, that these councils should meet twice in the year, or oftener if need be, to treat of the government of God's people;

how they should keep themselves from sin, should live in quiet, and should receive right. Our succeeding Saxon and Danish monarchs held frequent councils of this sort, as appears from their respective codes of laws; the titles whereof usually speak them to be enacted, either by the king with the advice of his wittena-gemote, or wise men, as *Hæc sunt instituta, quæ Edgarus rex consilio sapientium suorum instituit*; or to be enacted by those sages with the advice of the king, as, *Hæc sunt judicia, quæ sapientes consilio regis Ethelstani instituerunt*; or lastly, to be enacted by them both together, as *Hæc sunt institutiones, quas rex Edmundus et episcopi sui cum sapientibus suis instituerunt.*

There is also no doubt but these great councils were occasionally held under the first princes of the Norman line. Glanvil, who wrote in the reign of Henry II. speaking of the particular amount of an amercement in the sheriff's court, says, it had never yet been ascertained by the general assize or assembly, but was left to the custom of particular counties. Here the general assize is spoken of as a meeting well known, and its statutes or decisions are put in a manifest contradistinction to custom, or the common law. And in Edward III.'s time, an act of parliament, made in the reign of William the Conqueror, was pleaded in the case of the abbey of St. Edmund's-bury, and judicially allowed by the court.

Parliament, then, is the legislative branch of the supreme power of Great Britain, consisting of the king, the lords spiritual and temporal, and the knights, citizens, and burgesses, representatives of the commons of the realm, in parliament assembled.

The power and jurisdiction of parliament is so transcendent and absolute, that it cannot be confined, either for causes or persons, within any bounds.

The parliament must be summoned by the king, and not by authority of either house, at least forty days before it sits, although the convention parliament (the house of commons), from necessity, was summoned by the keepers of the liberty of England, by authority of parliament. It cannot begin without the king in person, or by representation. The principal privileges of parliament are the privilege of speech, which is essential to its existence, and to which there are no exceptions, except in some precedents of information filed for using free language during the reign of the second Charles, which it is to be hoped will never be drawn into authority, and the privilege of person from arrest and imprisonment for debt. This privilege lasts for forty days after the prorogation of the parliament, and forty days previous to its meeting. But all other privileges derogating from the common laws and matters of civil right are abolished by several statutes; and by 4 George III. c. 33, a trader, being a member of parliament, may be served with legal process for any just debt to the amount of one hundred pounds, and unless he makes satisfaction within two months, it shall be an act of bankruptcy. Vide statutes 12 William III. c. 3.; 2 and 3 Ann, c. 18.; 11 George II. c. 24. Statute 10 George III. c. 50. 4 Geo. III. c. 33.

It is one of the privileges of the peers to be entitled to vote by proxy, and also to enter a protest against any bill to which they may dissent. But all money bills must commence with the commons; and it is now the custom, if any alteration is made by the lords in a money bill, for the commons to reject it and bring in another, even though the new bill should contain the regulation proposed by the lords.

The house of commons is a denomination given to the lower house of parliament. In a free state, every man who is supposed a free agent ought to be in some measure his own governor, and therefore a branch at least of the legislative power should reside in the whole body of the people. In elections for representatives for Great Britain, anciently, all the people had votes; but king Henry VI. to avoid tumults, first appointed that none should vote for knights but such as were freeholders, did reside in the county, and had forty shillings yearly revenue. In so large a state as ours, therefore, it is very wisely contrived that the people should do that by their representatives, which it is impracticable to perform in person; representatives chosen by a number of minute and separate districts, wherein all the voters, or may be, easily distinguished. The counties are therefore represented by knights, elected by the proprietors of lands; the cities and boroughs are represented by citizens and burgesses, chosen by the mercantile, or supposed trading interest of the nation.

The peculiar laws and customs of the house of commons relate principally to the raising of taxes, and the elections of members to serve in parliament.

The method of making laws is nearly the same in both houses. In the house of commons, in order to bring in the bill, if the relief sought be of a private nature, it is first necessary to prefer a petition, which must be presented by a member, and usually set forth a grievance required to be remedied. This petition, when founded on facts of a disputable nature, is referred to a committee of members, who examine the matter alleged, and accordingly report it to the house; and then (or otherwise upon the mere petition), leave is given to bring in the bill. In public matters the bill is brought in upon motion made to the house, without any petition. If the bill begin in the house of lords, if of a private nature, it is referred to two judges, to make report. After the second reading, the bill is said to be committed, that is, referred to a committee, which is selected by the house, in matters of small importance; or, upon a bill of consequence, the house resolves itself into a committee of the whole house: a committee of the whole house is composed of every member, and to form it the speaker quits the chair, and may consequently sit and debate upon the merits of it as a private member, another mem-

ber being appointed chairman, for the time. In these committees the bill is usually debated clause by clause, amendments made, and sometimes it is entirely new modelled. Upon the third reading, further amendments are sometimes made, and if a new clause be added, it is done by tacking a separate piece of parchment on the bill, which is called a rider. The royal assent may be given two ways. 1, In person, when the king comes to the house of peers, in his crown and royal robes, and sending for the commons to the bar, the titles of all the bills that have passed both houses are read, and the king's answer is declared by the clerk of the parliament. If the king consent to a public bill, the clerk usually declares, *le roy le veut*, the king wills it so to be; if to a private bill, *soit fait comme il est desire*, be it as it is desired. If the king refuse his assent, it is in the gentle language of *le roy s'avisera*, the king will advise upon it. When a bill of supply is passed, it is carred up and presented to the king by the speaker of the house of commons, and the royal assent is thus expressed, *le roy remercie ses loyal sujets, accepte leur benevolence, et aussi le veut*, the king thanks his loyal subjects, accepts their benevolence, and also wills it so to be. By the statute 33 Henry VIII. c. 21, the king may give his assent by letters patent under his great seal, signed with his hand, and notified in his absence to both houses assembled together in the upper house. And when the bill has received the royal assent in either of these ways, it is then, and not before, a statute or act of parliament.

An act of parliament thus made is the exercise of the highest authority that this kingdom acknowledges upon the earth. It has power to bind every subject in the land, and the dominions thereunto belonging; nay even the king himself, if particularly named therein. And it cannot be altered, amended, dispensed with, suspended, or repealed, but in the same forms, and by the same authority of parliament.

Adjournment is no more than a continuance of the session from one day to another, as the word itself signifies; and this is done by the authority of each house separately every day, or for a longer period; but the adjournment of one house is no adjournment of the other.

Prorogation is the continuance of the parliament from one sessions to another, as an adjournment is a continuation of the session from day to day. And this is done by the royal authority, expressed either by the lord chancellor, in his majesty's presence, or by commission from the crown, or frequently by proclamation; and by this both houses are prorogued at the same time; it not being a prorogation of the house of lords or commons, but of the parliament. The session is never understood to be at an end until a prorogation; though, unless some act be passed, or some judgment given in parliament, it is, in truth, no session at all.

Dissolution is the civil death of the parliament; and this may be effected three ways; 1. by the king's will, expressed either in person or representation; 2. by the demise of the crown; 3. by length of time. By the king's will; for as the king hath the sole right of convening the parliament, so also it is a branch of the royal prerogative, that he may, whenever he pleases, prorogue the parliament for a time, or put a final period to its existence.

By the demise of the crown; a dissolution formerly happened immediately upon the death of the reigning sovereign; but the calling a new parliament immediately on the inauguration of the successor being found inconvenient, and dangers being apprehended from having no parliament in being, in case of a disputed succession; it was enacted by statutes 7 and 8 William III. c. 15, and 6 Anne, c. 7, that the parliament in being shall continue for six months after the death of any king or queen, unless sooner prorogued or dissolved by the successor. That if the parliament be, at the time of the king's death, separated by adjournment or prorogation, it shall notwithstanding assemble immediately; and that if no parliament is then in being, the members of the last parliament shall assemble and be again in parliament. Lastly, a parliament may be dissolved or expire by length of time.

The utmost extent of time that the same parliament was allowed to sit by the statute of 6 William, c. 3, was three years, after the expiration of which, reckoning from the return of the first summons, the parliament was to have no longer continuance. But by statute 1 George I. c. 38, in order, as it was alleged, to prevent the great and continued expenses of frequent elections, and the violent heats and animosities consequent thereupon, and for the peace and security of the government just then recovering from the last rebellion, this term was prolonged to seven years. So that as our constitution now stands, the parliament must expire, or die a natural death, at the end of every seventh year, if not sooner dissolved by the royal prerogative. In favour of liberty, however, it were much to be wished that this statute had never been passed. The pretexts which it assigns, as the grounds upon which it was passed, are by no means satisfactory.

Parliament (the High Court of), is the supreme court of the kingdom, not only for the making, but also for the execution of laws, by the trial of great and enormous offenders, whether lords or commoners, in the method of parliamentary impeachment. An impeachment before the lords, by the commons of Great Britain in parliament, is a prosecution of the already known and established law, and has been frequently put in practice; being a presentment to the most high and supreme court of criminal jurisdiction, by the most solemn grand inquest of the whole kingdom. A commoner cannot, however, be impeached before the lords for any capital offence, but only for high misdemeanors; a peer may be impeached for any crime. And they usually, in case of an impeachment of a peer for treason, address the crown to appoint a lord high steward, for the greater dignity and regularity of their proceedings; which high steward was formerly elected by the peers themselves, though

he was generally commissioned by the king; but it has of late years been strenuously maintained, that the appointment of a high steward in such cases is not indispensably necessary; but the house may proceed without one. The articles of impeachment are a kind of bills of indictment, found by the house of commons, and afterwards tried by the lords; who are in cases of misdemeanors considered not only as their own peers, but as the peers of the whole nation.

Much has been said and written upon the question of parliamentary reform, and the actual state of the parliament. The result of a candid inquiry will be this; namely, that the parliament, which has been, and now is the guardian of the liberties of the people, may hereafter by corruption become the means of their destruction, or the cause of their being surrendered, and the parliament itself have only a nominal existence. To prevent this, the people can only depend upon the frequent necessity of their representatives appealing to them for a renewal of their powers; that is, upon the frequency of elections, which in order also to be free should be made by as large a body of voters as possible, and that what are called rotten boroughs should at once be abolished. To object to this that it is an infringement of chartered rights, is an insult to common sense; for all charters are void that are against common right, and the only object of elections is for the benefit of the many, not for the private advantage of the few. That the present state of the representation of the people is not such as it ought to be, has been too generally admitted to be insisted upon here; but let it never be forgotten, that amongst those who have considered it as defective we must number Mr. Pitt, Mr. Fox, and the commentator Blackstone. In any future revision of the laws against bribery and corruption, it would be well to make the elected as well as the electors take the oath against bribery; and still further to narrow, though not wholly to exclude, the admission of placemen and contractors to seats in the house of commons. If the freedom of the press can be fully preserved, or obtained, we may venture to hope that every thing will ultimately be effected which the rational friends of freedom can desire; but a knowledge of our history will teach us, that little is to be gained for liberty by adherence to any precedents drawn from proceedings before the Revolution, the true principles of which seem the only genuine basis on which to rest the foundation of British liberty.

We shall conclude this article with an account of some general forms not taken notice of under any of the above heads.

In the house of lords, the princes of the blood sit by themselves on the sides of the throne; at the wall on the king's right hand, the two archbishops sit by themselves on a form. Below them the bishops of London, Durham, and Winchester, and all the other bishops sit according to the priority of their consecration. On the king's left hand the lord treasurer, lord president, and lord privy-seal, sit upon forms above all dukes except the royal blood; then the dukes, marquisses, and earls, according to their creation. Across the room are wool-sacks, continued from an ancient custom; and the chancellor, or keeper, being of course the speaker of the house of lords, sits on the first wool-sack before the throne, with the great seal or mace lying by him; below these are forms for the viscounts and barons. On the other wool-sacks are seated the judges, masters in chancery, and king's council, who are only to give their advice in points of law: but they all stand up till the king gives them leave to sit.

The commons sit promiscuously; only the speaker has a chair at the upper end of the house, and the clerk and his assistant sit at a table near him.

When a member of the house of commons speaks, he stands up uncovered, and directs his speech to the speaker only. If what he says be answered by another, he is not allowed to reply the same day, unless personal reflections have been cast upon him: but when the commons, in order to have a greater freedom of debate, have resolved themselves into a committee of the whole house, every member may speak to a question as often as he thinks necessary. In the house of lords they vote, beginning at the puisne or lowest baron, and so up orderly to the highest, every one answering, *content or not content*. In the house of commons they vote by *yeas* and *nays*; and if it be dubious, which are the greater number, the house divides. If the question be about bringing any thing into the house, the *yeas* go out; but if it be about any thing the house already has, the *nays* go out. In all divisions the speaker appoints four tellers, two of each opinion. In a committee of the whole house, they divide by changing sides, the *yeas* taking the right and the *nays* the left of the chair; and then there are but two tellers. If a bill pass one house, and the other demur to it, a conference is demanded in the painted chamber, where certain members are deputed from each house; and here the lords sit covered, and the commons stand bare, and debate the case. If they disagree, the affair is null; but if they agree, this, with the other bills that have passed both houses, is brought down to the king in the house of lords, who comes thither clothed in his royal robes; before him the clerk of the parliament reads the title of each bill, and as he reads, the clerk of the crown pronounces the royal assent or dissent. If it be a public bill, the royal assent is given in these words: *Le roy le veut*, "The king will have it so;" if private, *Soit fait comme il est desiré*, "Let the request be complied with;" if the king refuses the bill, the answer is *Le roy s'avisera*, "The king will think of it;" and if it be a money-bill, the answer is, *Le roy remercie ses loyaux sujets, accepte leur benevolence, et aussi le veut*; "The king thanks his loyal subjects, accepts their benevolence, and therefore wills it."

PARLIAMENTARY. *a.* (from *parliament.*) Enacted by parliament; pertaining to parliament (*Bacon*).

PA'RLOUR. *s.* (*parloir*, French; *parlatorio*, Italian.) 1. A room in monasteries, where the religious meet and converse. 2. A room in houses on the first floor, elegantly furnished for reception or entertainment (*Spen.*).

PA'RLOUS. *a.* (from *perilous.*) Keen; sprightly; waggish (*Dryden*).

PA'RLOUSNESS. *s.* (from *parlous.*) Quickness; keenness of temper.

PARMA, the duchy of a province of Italy, bounded on the north by the Po; on the north-east by the Mantuan; on the east by the duchy of Modena; on the south by Tuscany; and on the west by the duchy of Placentia. The air is very wholesome, on which account the inhabitants live to a great age. The soil is very fertile in corn, wine, oil, and hemp; the pastures feed a great number of cattle, and the cheese is in very high esteem. Here are considerable mines of copper and silver, and plenty of truffles, which many are very fond of. The cheese called Parmesan is no longer made in this country, but at Lodi in the Milanese, at Trino, Bologna, and some other places.

PARMA, a fortified city of Italy, capital of a duchy of the same name, and a bishop's see, with a citadel, and a university. It has a magnificent cathedral, many beautiful churches, and handsome streets. The cupola of the cathedral, and the church of St. John, are painted by the famous Correggio, who was a native of this place; and in the church of la Madonna della Stoccata are the tombs of the Farnese family. The other most remarkable places are the ducal palace, with its gallery and collection of artificial curiosities; the celebrated opera house, capable of containing 14,000 spectators; the large Benedictine convent, in which 12,000 soldiers were quartered in 1734; the Palazzo Giardino, a ducal palace connected with the town; and the promenade, between the town and citadel. The inhabitants, about 28,000, trade in silk and silk stockings. In 1734 a battle was fought here between the Austrians and the French and Sardinians, in which the former were defeated. Parma is situate on a river of the same name, which divides it into two parts, united by three bridges, 40 miles N.W. of Modena, and 60 S.E. of Milan. Lon. 10. 30 E. Lat. 44. 50 N.

PARMENIDES, a Greek philosopher of Elis, who flourished about 505 years before Christ. He was the pupil of Xenophanes, or Anaximander according to some. He maintained that there were only two elements, fire and the earth; and taught that the first generation of men was produced from the sun. He first discovered that the earth was round, and that it was placed in the centre of the universe.

PARMENIO, a celebrated general in the army of Alexander, who was more attached to his person as a man than as a monarch. When Darius king of Persia offered Alexander all the country west of the Euphrates, with his daughter Statira in marriage, and 10,000 talents of gold, Parmenio observed that he would accept these conditions if he were Alexander; "So would I, were I Parmenio," replied Alexander. This friendship so inviolable was sacrificed at a moment of suspicion, and Alexander who had too eagerly listened to a light accusation, ordered Parmenio and his son to be put to death, as if guilty of treason. Parmenio died in the 70th year of his age, B. C. 330; and it has been judiciously observed, that Parmenio obtained many victories without Alexander, but Alexander not one without Parmenio.

PARMESAN CHEESE. See CHEESE.

PARNASSIA. Grass of Parnassus. In botany, a genus of the class pentandria, order tetragynia. Calyx five-parted; petals five; nectaries five, heart-shaped, fringed with bristles ending in globular tips: flower terminal, single and white streaked with yellow. Indigenous to the bogs of our own country; sometimes cultivated.

PARNASSUS, a mountain of Phocis, one of the highest in Europe, anciently called Larnassos, from the boat of Deucalion λαρναξ, which was carried there in the universal deluge. It received the name of Parnassus from Parnassus the son of Neptune, and was sacred to the Muses, and to Apollo and Bacchus. The mountain, according to the poets, had only two tops, called Hyampea and Tethorea, on one of which the city of Delphi was situated.

PARNELL (Dr. Thomas), a very ingenious divine and poet in the early part of last century. He was archdeacon of Clogher, and the intimate friend of Mr. Pope; who published his works, with an elegant copy of recommendatory verses prefixed. He died in 1718, aged 39. Johnson says, "The life of Dr. Parnell is a task which I should very willingly decline, since it has been lately written by Goldsmith, a man of such variety of powers, and such felicity of performance, that he always seemed to do best that which he was doing; a man who had the art of being minute without tediousness, and general without confusion; whose language was copious without exuberance, exact without constraint, and easy without weakness.

"What such an author has told, who would tell again? I have made an extract from his larger narrative; and shall have this gratification from my attempt, that it gives me an opportunity of paying due tribute to the memory of a departed genius. '*Το γαρ γερας εστι θανοντων.*'

"The general character of Parnell is not great extent of comprehension, or fertility of mind. Of the little that appears still less is his own. His praise must be derived from the easy sweetness of his diction: in his verses there is more happiness than pains; he is sprightly without effort, and always delights though he never ravishes; every thing is proper, yet every thing seems casual. If there is some appearance of elaboration in the Hermit, the narrative, as it is less airy, is less pleasing.

Of his other compositions it is impossible to say whether they are the productions of nature, so excellent as not to want the help of art, or of art so refined as to resemble nature."

PARNUS, in the entomology of Fabricius, a tribe of the coleopterous genus ELATER, which see.

PARO'CHIAL. *a.* (*parochialis*, from *parochia*, low Lat.) Belonging to a parish (*Atterbury*).

PARODY, a popular maxim, adage, or proverb.

PARODY is also a poetical pleasantry, consisting in applying the verses written on one subject, by way of ridicule, to another; or in turning a serious work into a burlesque, by affecting to observe as near as possible the same rhymes, words, and cadences. The parody was first set on foot by the Greeks; from whom we borrow the name. It comes near to what some of our late writers call travesty. Others have more accurately distinguished between a parody and burlesque; and they observe, that the change of a single word may parody a verse; or of a single letter a word. Thus, in the last case, Cato exposed the inconstant disposition of Marcus Fulvius Nobilior, by changing Nobilior into Mobilior. Another kind of parody consists in the mere application of some known verse or part of a verse of a writer, without making any change in it, with a view to expose it. A fourth instance is that of writing verses in the taste and style of authors little approved.

PA'ROLE. *s.* (*parole*, Fr.) Word given as an assurance; promise given by a prisoner not to go away (*Cleaveland*).

PARONOMA'SIA. *s.* (παρωνομασια.) A rhetorical figure, in which, by the change of a letter or syllable, several things are alluded to.

PARONYCHIA. (παρονυχια; from παρα, about, and ονυξ, the nail.) Panaris. Panaritium. A whitlow, or whitloe. Any collection of pus formed in the fingers is termed by authors panaris, or whitloe, and is an abscess of the same nature with those arising in other parts of the body. These abscesses are situated more or less deep, which has induced the writers upon the subject to divide them into several species: accordingly they have ranged them under four heads, agreeable to the places where they are formed. The first kind of panaris is formed under the cuticle, on one side of the nail, and sometimes all round it. The second is seated in the fat lying under the skin, between that and the sheath which involves the flexor tendons. The third is described by authors to be formed within the sheath; and they still add a fourth species, arising between the periosteum and the bone.

PARO'NYMOUS. *a.* (παρωνυμος.) Resembling another word (*Watts*).

PA'ROQUET. *s.* (*parroquet*, or *perroquet*, Fr.) A small species of parrot (*Grew*).

PARORCHIDIUM. (παρορχιδιον; from παρα, and ορχις, a testicle.) A tumour in the groin, occasioned by the testicle, which is passing into the scrotum.

PAROS, a celebrated island among the Cyclades. Pliny says it is about 36 miles in circumference. It received the name of Paros, which it still bears, from Paros, a son of Jason, or as some maintain, of Parrhasius. The island of Paros was rich and powerful, and well known for its famous marble, always used by the best statuaries. Here modern travellers see quarries of a most extraordinary depth, whence the labyrinth of Egypt, and the porticoes of Greece received their splendor; they were so uncommonly deep, that in the clearest weather the workmen were obliged to use lamps. Paros is also famous for the fine cattle which it produces, and for its partridges and wild pigeons. The capital city was called Paros. The poet Archilochus was born there. The Arundelian marbles were engraved in this island in capital letters, B. C. 264, and as a valuable chronicle, preserved the most celebrated epochas of Greece from the year 1582, B. C.

PAROS, a town of the Archipelago, capital of the isle of Paros. It was anciently the largest and most powerful town of the Cyclades; but is greatly decayed. The walls of the castle are built of ancient pieces of marble, and most of the columns are placed longwise: some of them that stand upright support cornices of amazing size. The natives build their houses of marble, which they find ready cut to their hands; but they take no care to place the pieces in a regular manner: their fields likewise are inclosed with friezes, altars, and basso relievos. The inhabitants are so ignorant now, that, instead of great sculptors and skilful architects, they have nothing but carvers of mortars and salt-cellars. Paros is a bishop's see, and situate on the W. coast of the island. Lon. 25. 44 E. Lat. 37. 8 N.

PAROTID GLAND. (from παρα, about, and ους, the ear.) A large conglomerate and salival gland, situated under the ear, between the mamillary process of the temple bone, and the angle of the lower jaw. The excretory duct of this gland opens in the mouth, and is called, from its discoverer, the Stenonian duct.

PAROXYSM. (παροξυσμος; from παροξυνω, to aggravate.) A periodical exacerbation or fit of a disease.

PARR (Catherine), sixth queen to Henry VIII. was daughter of sir Thomas Parr, and widow of lord Latimer. She was well skilled in divinity, upon which she frequently conversed with the king. She laboured much for the establishment of the reformation, and her interference proved at one time so disagreeable to the monarch, that he permitted Gardiner to draw articles of impeachment against her, but her prudence restored her to the affection of the king. After Henry's death she married sir Thomas Seymour, who treated her with great harshness, so that she died the next year in child-bed, not without suspicion of poison, 1548.

PARR (Thomas), a peasant of Shropshire, who lived to the great age of 152 years and nine months. He performed penance in his

parish church at the age of 105 for a bastard child, and at 120 he married a second wife, by whom he had a child. He was in 1635 brought to London, and introduced to Charles I. but the change of situation, and particularly drinking wine, proved fatal to a constitution hitherto supported by more temperate and abstemious habits, and he died the same year.

The following summary of his life is copied from Oldys's MS. notes on Fuller's Worthies: Old Parr was born 1483; lived at home until 1500, aged 17, when he went out to service; 1518, aged 35, returned home from his master; 1522, aged 39, spent four years on the remainder of his father's lease: 1543, aged 60, ended the first lease he renewed of Mr. Lewis Porter; 1563, aged 80, married Jane, daughter of John Taylor, a maiden; by whom he had a son and a daughter, who both died very young; 1564, aged 81, ended the second lease which he renewed of Mr. John Porter; 1585 aged 102, ended the third lease he had renewed of Mr. Hugh Porter; 1588, aged 105, did penance in Alderbury church, for lying with Katharine Milton, and getting her with child; 1595, aged 112, he buried his wife Jane, after they had lived 32 years together; 1605, aged 122, having lived ten years a widower, he married Jane, widow of Anthony Adda, daughter of John Lloyd of Gilsells, in Montgomeryshire, who survived him; 1635, aged 152, he died; after they had lived together 30 years, and after 50 years possession of his last lease. See LONGEVITY.

PARRA. Jacana. In zoology, a genus of the class aves, order grallæ. Bill tapering, somewhat obtuse; nostrils oval, in the middle of the bill; front covered with lobate caruncles; wings spinous. Sixteen species, natives of the warmer parts of Asia, Africa, and America. The following are examples:

1. P. Chilensis. Chilese jacana. Claws moderate; legs brown; hind-head subcrested; bill conic, two inches long, a little curved at the tip; irids yellowish; nostrils pervious, square; caruncle two-lobed, red; neck, back and fore-part of the wings violet; throat and breast black; wings and short tail brown; spurs on the wings yellowish, conic, bony, half an inch long. Inhabits Chili; size of a jay, but the legs longer; feeds on worms and insects; is noisy, and defends itself by the spurs on its wings; builds in the grass, and lays four tawny eggs, speckled with black.

2. P. jacana. Chesnut jacana. Hind-claws very long; legs greenish; bill tawny; body chesnut-purple; head and neck beneath violet-black; quill-feathers olive-green, edged at the tip with brown; tail-feathers at the tip black-violet, two middle ones varied with bay and brown; spurs on the wings strong, yellow; caruncle orange, two-parted, hanging each side the head. Inhabits watery places of South America; ten inches long; is very noisy, and continually making a shrill cry; generally seen in pairs; flesh good.

3. P. chavaria. Faithful jacana. Toes long; legs tawny; hind-head crested; bill dirty-white, upper mandible like that of the dung-hill cock; on both sides at the base of the bill a red membrane extending to the temples, in the middle of which are the eyes; irids brown; crest on the hind-head consists of about twelve black feathers, three inches long, pendent; rest of the neck covered with thick black down; body brown, wings and tail blackish; wing-spurs two or three half an inch long; belly light black; thighs half bare; toes so long as to entangle each other in walking. Inhabits the rivers and inundated places near Carthagena in America; feeds on herbs; its gait is slow, and it cannot run unless assisted by the wings, but flies easily and swiftly. When the skin is touched a crackling is felt; voice clear and loud. The natives keep one of these birds tame to wander with the poultry and defend them against birds of prey, which it does by means of the spurs on its wings. It never deserts the charge committed to its care, but brings them home at night. It will readily suffer itself to be handled by adults, but not by children; is about the size of a cock, and stands a foot and half from the ground. See Nat. Hist. Pl. CLXI.

PARRAKEET, in ornithology. See PICA.

PARRAMATTA, a town or settlement of English convicts in New South Wales. It is seated at the head of the harbour of Port Jackson, 11 miles W. of Sydney Cove, between Rose Hill and the landing-place in the creek which forms the head. In 1791, near 1000 acres of land were either in cultivation, or cleared for that purpose; and the soil, in most places, was found to be remarkably good. Lon. 151. 39 E. Lat. 33. 50 S.

PARRELS, in a ship, are frames made of trucks, ribs, and ropes, which having both their ends fastened to the yards, are so contrived as to go round about the masts, that the yards by their means may go up and down upon the mast. These also, with the breast-ropes, fasten the yards to the masts.

PARRET, a river in Somersetshire, which rises in the S. part of the county, receives the Ivel and Thone, and enters the Bristol Channel, at Bridgewater Bay.

PARRHASIA, a town of Arcadia, founded by Parrhasius, the son of Jupiter. The Arcadians are sometimes called Parrhasians, and Arcas Parrhasis.

PARRHASIUS, a famous painter of Ephesus in the age of Zeuxis, about 415 years before Christ. He particularly excelled in strongly expressing the violent passions. He had much invention, and was peculiarly happy in his designs. He once entered the lists against Zeuxis, and when they had produced their respective pieces, the birds came to pick the grapes which Zeuxis had painted. Immediately Parrhasius exhibited his piece, and Zeuxis said, "Remove your curtain, that we may see the painting." The curtain was the painting, and Zeuxis acknowledged himself conquered by exclaiming, "Zeuxis has deceived birds, but Parrhasius has deceived Zeuxis himself."

PARRHASIUS (James), an Italian grammarian, born at Cosenza, 1470. He taught belles lettres and rhetoric at Milan, where he was much admired for his graceful delivery. On a charge of improper converse with his pupils, he retired to Vicenza, and afterwards to Rome. His application soon rendered him incapable of acting as professor, and upon his return home he fell into a fever, which proved fatal. He wrote some fragments of antiquity—commentaries on Horace's art of poetry—Ovid's—Claudian, &c.

PA'RRICIDE. *s.* (*parricide*, Fr.) 1. One who destroys his father (*Shakspeare*). 2. One who destroys or invades any to whom he owes particular reverence. 3. The murder of a father; murder of one to whom reverence is due (*Dryden*).

PARRICI'DAL. PARRICI'DIOUS. *a.* (from *parricida*, Lat.) Relating to parricide; committing parricide (*Brown*).

PARROCEL (Joseph), of Brignoles in Provence, was eminent as a painter and engraver. He studied under one of his brothers, and under Bourguignon, and was admitted member of the French academy of painting. His portraits, and also his historical pieces, and his battles were executed with great taste and effect. He died 1704, aged 56. His son Charles was also an eminent artist, and died 1752, aged 53. His conquests of Louis XV. possess merit.

PARROT. In ornithology. See PICA.

To PA'RRY. *v. n.* (*parer*, French.) To put by thrusts; to fence (*Locke*).

To PARSE. *v. a.* (from *pars*, Lat.) To resolve a sentence into the elements or parts of speech (*Ascham*).

PARSHORE, a neat old town in Worcestershire, having formerly an abbey church. At present it has two parishes, Holy Cross and St. Andrew; it contains about 320 houses; and has markets on Tuesdays and Saturdays.

PARSIMO'NIOUS. *a.* (from *parsimony*.) Covetous; frugal; sparing (*Addison*).

PARSIMO'NIOUSLY. *ad.* Covetously; frugally; sparingly (*Swift*).

PARSIMO'NIOUSNESS. *s.* (from *parsimonious*.) A disposition to spare and save.

PA'RSIMONY. *s.* (*parsimonia*, Lat.) Frugality; covetousness; niggardliness; saving temper (*Swift*).

PARSLEY. In botany. See APIUM.

PARSLEY (Macedonian). See BUBON.

PARSLEY (Stone). See BUBON.

PARSNEP. In botany. See PASTINACA.

PA'RSON. *s.* (*parochianus*, Lat.) 1. The priest of a parish; one that has a parochial charge or cure of souls (*Clarendon*). 2. A clergyman (*Shakspeare*). 3. It is applied to dissenting teachers.

PARSON, and VICAR. A parson, *persona ecclesiæ*, is one that hath full possession of all the rights of a parochial church. He is called parson, *persona*, because by his person the church, which is an invisible body, is represented; and he is in himself a body corporate, in order to protect and defend the rights of the church (which he personates) by a perpetual succession. He is sometimes called the rector, or governor of the church: but the appellation of parson (however it may be depreciated by familiar, clownish, and indiscriminate use) is the most legal, most beneficial, and most honourable title that a parish-priest can enjoy; because such a one (sir Edward Coke observes), and he only, is said *vicem seu personam ecclesiæ gerere*. A parson has, during his life, the freehold in himself of the parsonage house, the glebe, the tithes, and other dues. But these are sometimes appropriated; that is to say, the benefice is perpetually annexed to some spiritual corporation, either sole or aggregate, being the patron of the living; whom the law esteems equally capable of providing for the service of the church as any single private clergyman. See APPROPRIATION.

The appropriating corporations, or religious houses, were wont to depute one of their own body to perform divine service, and administer the sacraments, in those parishes of which the society was thus the parson. This officiating minister was in reality no more than a curate, deputy, or vicegerent of the appropriator, and therefore called *vicarius*, or vicar. His stipend was at the discretion of the appropriator, who was, however, bound of common right to find somebody, *qui illi de temporalibus, episcopo de spiritualibus debeat respondere*. But this was done in so scandalous a manner, and the parishes suffered so much by the neglect of the appropriators, that the legislature was forced to interpose: and accordingly it is enacted, by statute 15 Richard II. c. 6. that in all appropriations of churches, the diocesan bishop shall ordain (in proportion to the value of the church) a competent sum to be distributed among the poor parishoners annually; and that the vicarage shall be sufficiently endowed. It seems the parish were frequently sufferers, not only by the want of divine service, but also by withholding those alms for which, among other purposes, the payment of tithes was originally imposed: and therefore in this act a pension is directed to be distributed among the poor parochians, as well as a sufficient stipend to the vicar. But he, being liable to be removed at the pleasure of the appropriator, was not likely to insist too rigidly on the legal sufficiency of the stipend; and therefore, by statute 4 Henry IV. c. 12. it is ordained, that the vicar shall be a secular person, not a member of any religious house; that he shall be vicar perpetual, not removable at the caprice of the monastery; and that he should be canonically instituted and inducted, and be sufficiently endowed, at the discretion of the ordinary, for these three express purposes: to do divine service, to inform the people, and to keep hospitality. The endowments, in consequence of these statutes, have usually been by a portion of the glebe or land belonging to the parsonage, and a particular share of the tithes, which the appropriators found it most troublesome to collect, and which are therefore generally called petty or small tithes; the greater, or perdial tithes,

being still reserved to their own use. But one and the same rule was not observed in the endowment of all vicarages. Hence some are more liberally, and some more scantily, endowed: and hence the tithes of many things, as wood in particular, are in some parishes rectorial, and in some vicarial tithes.

The distinction therefore of a parson and vicar is this: the parson has for the most part the whole right to all the ecclesiastical dues in his parish; but a vicar has generally an appropriator over him, entitled to the best part of the profits, to whom he is in effect perpetual curate, with a standing salary. Though in some places the vicarage has been considerably augmented by a large share of the great tithes; which augmentations were greatly assisted by the statute 27 Charles II. c. 8. enacted in favour of poor vicars and curates, which rendered such temporary augmentations (when made by the appropriators) perpetual.

The method of becoming a parson or vicar is much the same. To both there are four requisites necessary; holy orders, presentation, institution, and induction.

For the rights of a parson or vicar, in his tithes and ecclesiastical dues, see TITHES. As to his duties, they are so numerous, that it is impracticable to recite them here with any tolerable conciseness or accuracy; but the reader who has occasion may consult bishop Gibson's Codex, Johnson's Clergyman's Vade Mecum, and Burn's Ecclesiastical Law. We shall therefore only just mention the article of residence, upon the supposition of which the law doth style every parochial minister an incumbent. By statute 21 Henry VIII. c. 13. persons willingly absenting themselves from their benefices, for one month together, or two months in the year, incur a penalty of 5l. to the king, and 5l. to any person that will sue for the same; except chaplains to the king, or others therein mentioned, during their attendance in the household of such as retain them; and also except all heads of houses, magistrates, and professors in the universities, and all students under forty years of age residing there, *bona fide*, for study. Legal residence is not only in the parish, but also in the parsonage house; for it hath been resolved, that the statute intended residence, not only for serving the cure and for hospitality, but also for maintaining the house, that the successor also may keep hospitality there.

We cannot terminate this article without recommending to those who have thoughts of entering the clerical profession the perusal of Izaak Walton's Life of George Herbert, rector of Bemerton; the same Mr. Herbert's admirable piece called A Priest to the Temple, or the Country Parson; the Life of Hooker, prefixed to his Ecclesiastical Polity; Burnet's Pastoral Care; Mason's Pastor and Student; and Dr. Campbell's Lectures on the Pastoral Character.

PARSONAGE. *s.* (from *parson.*) The benefice of a parish; a rectory (*Addison*).

PARSONS (Robert), or PERSONS, son of a blacksmith near Bridgewater, was born 1546, and educated at Baliol college, Oxford, at the expence of the vicar of his parish. He became fellow and tutor of his college; but being accused of incontinence, and of embezzling the college money, he left the university, and retired to Antwerp, then to Louvain and Padua, and afterwards to Rome, where he renounced the protestant faith, and entered among the jesuits. The pope permitted him to establish an English college at Rome, for the instruction of missionaries to attempt the conversion of the English nation. He came himself in disguise to London; but his violent attack against the religion of England, and the doctrine that Elizabeth might safely be deposed, were too daring to be long concealed from Burleigh, yet he escaped his pursuers. On the preparations of Philip to invade England, the *good* father stirred up not only foreigners, but natives, against their country; and when the armada was destroyed, he endeavoured to excite a rebellion in the kingdom. This insidious, and intriguing jesuit, died 1610. His writings were 33 tracts, chiefly on divinity and controversial subjects.

PARSONS (James), a learned physician, born at Barnstaple, in Devonshire, in 1705. His father being appointed barrack-master, at Bolton, in Ireland, he received his education in Dublin; from whence he went to Paris, where he attended Astruc, and others equally eminent, as also the chemical lectures of Lemery and Bouldue, and those of botany, by Jussieu. He went to the university of Rheims, in Champaigne, and obtained his degrees in 1736. In July of the same year, he came to London, and in 1740, was elected a member of the royal society. In 1751, he was admitted a licentiate of the college of physicians. Through the interest of his friend Dr. Douglas he was appointed physician to the infirmary of St. Giles's. He died after a week's illness, 1770, universally regretted.

PART. *s.* (*pars*, Lat.) 1. Something less than the whole; a portion; a quantity taken from a larger quantity (*Knolles*). 2. Member (*Locke*). 3. Particular; distinct species (*Law*). 4. Ingredient in a mingled mass (*Blackmore*). 5. That which, in division, falls to each (*Dryden*). 6. Proportional quantity (*Chapman*). 7. Share; concern (*Pope*). 8. Side; party, interest; faction (*Daniel*). 9. Something relating or belonging (*Shakspeare*). 10. Particular office or character (*Bacon*). 11. Character appropriated in a play (*Shakspeare*). 12. Business; duty (*Bacon*). 13. Action; conduct (*Shakspeare*). 14. Relation reciprocal (*Tillotson*). 15. *In good part*; *in ill part*; as well done; as ill done (*Hooker*). 16. (In the plural.) Qualities; powers; faculties; or accomplishments (*Sidney*). 17. (In the plural.) Quarters; regions; districts (*Sidney*). 18. *For the most part.* Commonly; oftener than otherwise (*Heylin*).

PART, in music, the name of each of the melodies of any harmonic composition, and which, when performed in union, form its

harmony. Four is the fewest number of parts with which the chords necessary to elaborate harmony can be completely filled.

At the first introduction of counterpoint there were only two parts, one of which was called tenor, and the other discant. At length a third was added called triplum, and afterwards a fourth called quadruplum. There are instrumental parts; as organ part, violin part, violoncello part, &c. and the paper or book on which is separately written the particular melody appropriated to any single performer, or set of performers of the same melody, is called a part. In concert, every performer, except the composer, or conductor, who generally uses the score, sings or plays from his single part.

Parts of vegetables (Primary), are, 1. The root, descending, imbibing fluid, nourishing. 2. The herb, ascending, breathing air, moving. 3. The fructification, expanding, inhaling ether, generating.

Parts of speech, in grammar. See Grammar.

Part. *ad.* Partly; in some measure (*Shakspeare*).

To Part. *v. a.* 1. to divide; to share; to distribute (*Acts*). 2. To separate; to disunite (*Dryden*). 3. To break into pieces (*Leviticus*). 4. To keep asunder (*Shaks.*). 5. To separate combatants (*Shakspeare*). 6. To secern (*Prior*).

To Part. *v. n.* 1. To be separated (*Dryden*). 2. To quit each other (*Swift*). 3. To take farewell (*Shakspeare*). 4. To have share (*Isaiah*). 5. (*partir*, Fr.) To go away; to set out (*Dryden*). 6. *To* Part *with*. To quit; to resign; to lose; to be separated from (*Tay.*).

PA'RTABLE. *a.* (from *part.*) Divisible; such as may be parted (*Camden*).

PA'RTAGE. *s.* (*partage*, Fr.) Division; act of sharing or parting (*Locke*).

To PARTA'KE. *v. n.* preterit, *partook*; participle passive, *partaken*. (*part* and *take*.) 1. To have share of any thing; to take share with (*Locke*). 2. To participate; to have something of the property, nature, claim, or right (*Bacon*). 3. To be admitted to; not to be excluded (*Shakspeare*). 4. To combine; to unite in some bad design.

To Parta'ke. *v. a.* 1. To share; to have part in (*Milton*). 2. To admit to part; to extend participation to: obsolete (*Spenser*).

PARTA'KER. *s.* (from *partake.*) 1. A partner in possessions; a sharer of any thing; an associate with (*Hooker*). 2. Sometimes with *in* before the thing partaken (*Shakspeare*). 3. Accomplice; associate (*Psalms*).

PA'RTER. *s.* (from *part.*) One that parts or separates (*Sidney*).

PARTERRE, in gardening, a level division of ground, which, for the most part, faces the south, and best front of a house; and is generally furnished with greens, flowers, &c.

PARTHENAY, a town of France, in the department of Two Sevres. It carries on a considerable trade in cattle and corn, and is seated on the Thoue, 17 miles S. of Thours. Lon. 0. 10 W. Lat. 46. 44 N.

Parthenay (Anne de), a lady of great genius and learning, and wife of Anthony de Pons, count de Marennes. She was one of the brightest ornaments of the court of the duchess of Ferrara, being a proficient in the Latin and Greek languages. She was a follower of Calvin, and took great pains to propagate his principles.

Parthenay (Catharine de), niece of the above lady, and heiress to the lordship of Soubise; was married in 1568, at the age of 14, to the baron de Pons; and in 1575, to René, viscount Rohan. The famous duke de Rohan, who so courageously defended the protestant cause in France during the civil wars of Louis XIII. was her eldest son. Catharine, one of her three daughters, who married the duke of Deux-Ponts, made the following answer to Henry IV. her admirer, "I am too poor, sire, to be your wife, and too proud to be your mistress." She died in 1607.

PARTHENIÆ and Parthenii, a certain number of desperate citizens of Sparta. They were the offspring of all the young men employed in the Messenian war, who had not taken an oath not to return to Sparta before Messenia was subdued. They left the army commissioned to raise a future generation by a familiar and promiscuous intercourse with all the unmarried women of the state, and the children sprung from this union were called Partheniæ, or sons of virgins (παρθενος) The Partheniæ, upon the return of the Spartans from the war, finding themselves despised on account of their illegitimacy, conspired with the Helots against the state, and, at length, with Phalantus their ring-leader at their head, they settled in Magna Græcia, and built Tarentum, about 707 years before Christ.

PARTHENIUM. Bastard-feverfew. In botany, a genus of the class syngenesia, order polygamia necessaria. Receptacle chaffy, flat; seeds obovate, mostly naked; calyx five-leaved: two species.

1. P. hysterophorus. Cut-leaved bastard feverfew: wild wormwood. An annual of the West Indies; possessing much the same qualities as common feverfew; flowering among us in July and August.

2. P. integrifolium. Entire-leaved parthenium. A perennial of Virginia, rising about three feet, with thick, round, fleshy stems, flowers corymbed and terminal, heads snow-white above, like those of gnaphalium, whitish-green below.

PARTHENIUS, a river of Paphlagonia, which, after separating Bithynia, falls into the Euxine sea, near Sesamum. It received its name either because the virgin Diana bathed herself there, or perhaps it received it from the purity and mildness of its waters.—2. A favourite of the emperor Domitian. He conspired against his imperial master, and assisted to murder him.

PARTHENON, a temple of Athens, sacred to Minerva. It was destroyed by the Persians, and afterwards rebuilt by Pericles, in a more magnificent manner. All the cir-

cumstances which related to the birth of Minerva were beautifully and minutely represented in bass-relief, on the front of the entrance. The statue of the goddess was 26 cubits high, and made of gold and ivory. It passed for one of the master-pieces of Phidias.

PARTHENOPÆUS, a son of Meleager and Atalanta, was one of the seven chiefs who accompanied Adrastus the king of Argos in his expedition against Thebes. He was killed by Amphidicus.

PARTHENOPE, one of the Sirens.—A city of Campania, afterwards called Neapolis, or the new city, when it had been beautified by a colony from Eubœa. It is now called Naples. It received the name of Parthenope from one of the Sirens, whose body was found on the shore there.

PARTHIA, a celebrated country of Asia, bounded on the west by Media, south by Carmania, north by Hyrcania, and east by Aria, &c. containing, according to Ptolemy, 25 large cities, the most capital of which was called Hecatompylos from its hundred gates. According to some authors the Parthians were Scythians by origin. They became successively tributary to the empire of the Assyrians, Medes, and Persians, and when Alexander invaded Asia, they submitted like the other dependent provinces of Persia. Arsaces, a man of obscure origin, but of great military powers, roused at length by the oppression of Agathocles, a lieutenant of Antiochus, placed himself at the head of his countrymen, and laid the foundation of the Parthian empire, about 250 years before the Christian era. The Macedonians attempted in vain to recover it, and a race of active princes, who assumed the sirnames of Arsacides from the founder, rendered it so formidable, that it even disputed the empire of the world with the Romans. It remained a kingdom till the reign of Artabanus, who was killed about the year 229 B.C. and from that time it became a province of the newly re-established kingdom of Persia, under Artaxerxes. The Parthians were naturally strong and warlike, and were esteemed the most expert horsemen and archers in the world.

PARTI, PARTIE, Party, or Parted, in heraldry, is applied to a shield or escutcheon, denoting it divided or marked out into partitions. *Parti per pale*, is when the shield is divided perpendicularly into two halves, by a cut in the middle from top to bottom. *Parti per fess*, is when the cut is across the middle from side to side. *Parti per bend dexter*, is when the cut comes from the upper corner of the shield on the right hand, and descends athwart to the opposite lower corner. *Parti per bend sinister*, is when the cut, coming from the upper left corner, descends across to the opposite lower one. All these partitions, according to M. de la Colombiere, have their origin from the cuts and bruises that have appeared on shields after engagements; and, being proofs of the dangers to which the bearers had been exposed, they gained them esteem: for which reason they were transmitted to posterity, and became arms and marks of honour to their future families.

PA'RTIAL. *a.* (*partial*, French.) 1. Inclined antecedently to favour one party in a cause, or one side of the question more than the other (*Maluchi*). 2. Inclined to favour without reason (*Locke*). 3. Affecting only one part; subsisting only in one part; not general (*Burnet*).

PARTIAL UMBEL, in botany; otherwise called umbellule. A smaller umbel, proceeding from the general or universal umbel. Umbellula quæ prodiit ex universali. The involucre at the foot of this is called the partial involucre. Involucrum partiale. Pedunculus partialis, a partial peduncle, is a subdivision of a common peduncle See UMBEL and PEDUNCLE.

PARTIA'LITY. *s.* (*partialité*, Fr. from *partial.*) Unequal state of the judgment and favour of one above the other (*Spenser*).

To PARTIALI'ZE. *v. a.* (*partialiser*, Fr. from *partial.*) To make partial (*Shakspeare*).

PA'RTIALLY. *ad.* (from *partial.*) 1. With unjust favour or dislike. 2. In part; not totally (*Rogers*).

PARTIBI'LITY. *s.* (from *partible.*) Divisibility; separability.

PA'RTIBLE. *a.* (from *part.*) Divisible; separable (*Digby.*)

PARTI'CIPABLE. *a.* (from *participate.*) Such as may be shared or partaken (*Norris*).

PARTI'CIPANT. *a.* (*participant*, French). Sharing; having share or part (*Bacon*).

To PARTI'CIPATE. *v. a.* (*participo*, Latin; *participer*, French.) 1. To partake; to have share (*Shakspeare*). 2. To have part of more things than one (*Denham*). 3. To have part of something common with another (*Bacon*).

To PARTI'CIPATE. *v. a.* To partake; to receive part of; to share (*Hooker*).

PARTICIPA'TION. *s.* (*participation*, Fr. from *participate.*) 1. The state of sharing something in common (*Hooker*). 2. The act or state of receiving or having part of something (*Stillingfleet*). 3. Distribution; division into shares (*Raleigh*).

PARTICI'PIAL. *a.* (*participialis*, Latin.) Having the nature of a participle.

PARTICI'PIALLY. *ad* In the sense or manner of a participle.

PA'RTICIPLE. *a.* (*participium*, Latin.) 1. A word partaking at once the qualities of a noun and verb. (See GRAMMAR). 2. Any thing that participates of different things: not used (*Bacon*).

PA'RTICLE. *s.* (*particule*, French; *particular*, Latin.) 1. Any small proportion of a greater substance (*Newton*). 2. A word unvaried by inflection (*Hooker*).

PARTICLE, a term in theology, used in the Latin church for the crumbs or little pieces of consecrated bread called in the Greek church μεριδες. The Greeks have a particular ceremony, called των μεριδων, of the particles, wherein certain crumbs of bread, not consecrated, are offered up in honour of the Virgin,

St. John Baptist, and several other saints. They also give them the name of προσφορα, oblation. Gabriel archbishop of Philadelphia wrote a little treatise express περι των μεριδων, wherein he endeavours to shew the antiquity of this ceremony, in that it is mentioned in the liturgies of St. Chrysostom and Basil.—There has been much controversy on this head between the reformed and catholic divines.

PARTICLE, in grammar, a denomination for all those small words that tie or unite others together, or that express the modes or manners of words, usually included by grammarians under these four parts of speech, viz. adverbs, prepositions, interjections, and conjunctions.

PARTI'CULAR. *a.* (*particulier*, French.) 1. Relating to single persons; not general. 2. Individual; one distinct from others (*Dryden*). 3. Noting properties or things peculiar: *he had nothing* particular *in his conduct* (*Bacon*). 4. Attentive to things single and distinct. 5. Single; not general (*Sidney*). 6. Odd; having something that eminently distinguishes him from others.

PARTI'CULAR. *s.* 1. A single instance; a single point (*South*). 2. Individual; private person (*L'Estrange*). 3. Private interest (*Hooker*). 4. Private character; single self; state of an individual (*Shakspeare*). 5. A minute detail of things singly enumerated (*Ayliffe*). 6. *In particular.* Peculiarly; distinctly (*Dryden*).

PARTICULA'RITY. *s.* (*particularité*, Fr.) 1. Distinct notice or enumeration (*Sidney*). 2. Singleness; individuality (*Hooker*). 3. Petty account; private incident (*Addison*). 4. Something belonging to single persons (*Shakspeare*). 5. Something peculiar (*Addison*).

To PARTI'CULARIZE. *v. a.* (*particulariser*, French.) To mention distinctly; to detail; to show minutely (*Atterbury*).

PARTI'CULARLY. *ad.* (from *particular.*) 1. Distinctly; singly; not universally (*South*). 2. In an extraordinary degree (*Dryden*).

To PARTI'CULATE. *v. a.* (from *particular.*) To make mention singly: obsolete (*Camden*).

PARTIES, are those which are named in a deed or fine, as parties to it. See FINE.

PA'RTISAN. *s.* (*pertuisan*, French.) 1. A kind of pike or halberd (*Shakspeare*). 2. (from *parti*, French.) An adherent to a faction (*Addison*). 3. The commander of a party detached from the main body upon some sudden excursion. 4. A commander's leading staff (*Ainsworth*).

PARTITE LEAF. In botany, a parted leaf. Simple, but divided almost down to the base. According to the number of divisions it is called bipartite, tripartite, &c. Bipartite, or two-parted; tripartite, or three-parted, &c. It is applied in the same sense to the perianth and corol.

PARTI'TION. *s.* (*partition*, French; *partitio*, Latin.) 1. The act of dividing; a state of being divided (*Shakspeare*). 2. Division; separation; distinction (*Hooker*). 3. Part divided from the rest; separate part (*Milton*). 4. That by which different parts are separated (*Bacon*). 5. Part where separation is made (*Dryden*).

PARTITION. *Dissepimentum.* In botany, a wall separating a pericarp internally into cells. This is either parallel; that is, approaching in breadth and its transverse diameter to the valves: as in lunaria and draba. Or, contrary; that is, narrower than the valves: or, as it is expressed more fully in Delin. Pl.—narrower, when the valves by being squeezed or contracted become concave. Angustius ubi valvulæ coarctatæ evadunt concavæ. This is exemplified in biscutella and thlaspi. Linnéus borrowed these terms from Tournefort; and says that they are to be understood cum grano salis. We should have conceived a parallel partition in a silique or pod to have been in the direction of the valves; a contrary or transverse one, at right angles with the valves.

To PARTI'TION. *v. a.* To divide into distinct parts (*Bacon*).

PA'RTLET. *s.* A name given to a hen; the original signification being a ruff or band, or covering for the neck (*Hall*).

PA'RTLY. *ad.* (from *part.*) In some measure; in some degree; in part (*Addison*).

PA'RTNER. *s.* (from *part.*) 1. Partaker; sharer; one who has part in any thing; associate (*Milton*). 2. One who dances with another (*Shakspeare*).

To PA'RTNER. *v. a.* (from the noun.) To join; to associate with a partner (*Shakspeare*).

PA'RTNERSHIP. *s.* (from *partner.*) 1. Joint interest or property (*Dryden*). 2. The union of two or more in the same trade.

PARTO'OK. The preterit of *partake.*

PARTRIDGE. (See TETRAO.) The partridge being naturally a cowardly, fearful, simple bird, is easily deceived or beguiled with any device whatever, by train-bait, engine, call, stale, &c.

Its haunts are not certain, but various; any covert will serve its turn, and sometimes none at all.

The places partridges delight in most are corn fields, especially whilst the corn grows, for under that cover they shelter and breed; neither are those places unfrequented by them when the corn is cut, by reason of the grain they find there, and the covert or shelter of the wheat stubble. Here among the furrows, the clots, brambles, and long grass, they will hide both themselves and coveys, which are sometimes twenty or even thirty in a single covey.

When the winter season is arrived, and these stubble fields are ploughed up, or oversoiled with cattle, partridges resort into the upland meadows, and lodge in the dead grass, or fog under hedges amongst mole hills, or under the roots of trees; sometimes they resort to coppices and underwoods, especially if any corn-fields be adjacent, or where broom, brakes, fern, &c. offer on asylum.

In the harvest-time, when every field is full

of men and cattle, you will find them by day in the fallow-fields adjoining the corn-fields, where they lie lurking till evening or morning, and then they feed among the sheaves of corn.

When you know their haunts, according to the situation of the country and season of the year, your next care must be to find them out in their haunts, which is done several ways. Some attempt it by the eye only; and this art can never be taught, but learned by frequent experience, distinguishing thereby the colour of the partridge from that of the earth, and how, and in what manner they lodge and couch together; by which means you may come near enough to them, they being a very lazy bird, and so unwilling to take the wing, that you may almost set your foot upon them before they will stir, provided you do not stand and gaze on them, but be in continual motion, otherwise they will spring up and fly away.

Another mode of discovering them is by going to their haunts very early in the morning, or at the close of the evening, which is called the clucking-time, and there listening for the calling of the cock-partridge, which is very loud and earnest, when after some few calls the hen will answer, and by this means they meet together, which you may know by their mutual rejoicing and chattering; upon hearing of which take your range about them, drawing nearer and nearer to the place where you heard them cluck in; casting your eye towards the furrows of the lands, and there you will soon find where the covey lies.

The best, surest, and easiest method of finding partridges is by the call, having first learned the true and natural notes of the partridge, knowing how to tune every note in its proper key, and applying them to their due times and seasons.

Being perfect herein, either mornings or evenings (all other times being improper), go to their haunts, and having secured yourself in some secret place where you may see and not be seen, listen a while if you can hear the partridges call; if you do, answer them again in the same notes, and as they change or double their notes, so must you in like manner; thus continue till they draw nearer and nearer to you: having them in your view, fall down on your back, and lie without motion, as if you were dead; by this means you may learn their whole number.

To take partridges with nets.—The nets for taking partridges must be every way like pheasant-nets, both in length and breadth, except that the meshes must be smaller; they should be made of the same thread, and dyed of the same colour.

Having found out the covey, draw forth your nets, and taking a large circumference, walk a good round pace with a careless eye, rather from than towards them, till you have trimmed your nets, and made them ready for the purpose; which done, you must draw in your circumference less and less, till you come within the length of your net, then pricking down a stick about three feet long, fix one end of the line to the net, and make it fast in the earth as you walk about, for you must make no stop whatever: then letting the net slip out of your hands, spread it open as you go, and so carry and lay it all over the partridges.

If they should lie straggling, so that you cannot cover them all with one net, then draw forth another, and do with that as you did with the former; and so a third if there be occasion; having so done, rush in upon them suddenly, when being frightened they will fly up, and become entangled in the nets.

To take partridges with bird-lime.—Get the largest wheat-straws you can, and cut them off between knot and knot, and lime them with the strongest bird-lime. Go to the haunts of partridges and call; if you be answered, prick at some distance from you your lime straws; in many cross-rows and ranks, cross the lands and furrows, taking in two or three lands at least, then lie close and call again, not ceasing till you have drawn them towards you, so that they be intercepted on the way by your limed straws, which they shall no sooner touch than they will be ensnared; and as they all run together like a brood of chickens, they will so besmear and daub each other, that very few will escape.

This way of taking partridges is only to be used in stubble-fields, from August till Christmas: but if you would take them in woods, pastures, or meadows, you must lime rods, the same as for pheasants, and stick them in the ground after the same manner.

To drive partridges.—This method of taking partridges is more agreeable than any other: it is conducted as follows:

Make an engine in the form of a horse, cut out of canvas, and stuff it with straw, or such like matter. With this artificial horse and your nets, go to the haunts of partridges, and having found out the covey, and pitched your nets below, proceed above, and taking the advantage of the wind, drive downward; and let your nets be pitched slope wise, and hovering. Then having your face covered with something green, or of a dark blue, and, putting the engine before you, stalk towards the partridges with a slow pace, raising them on their feet, but not their wings, and they will naturally run before you.

If they chance to run a by-way, or contrary to your purpose, then cross them with your engine, and by so facing them, they will run into that track you would have them: thus by a gentle slow pace you may make them run almost which way you will, and at last drive them effectually into your net.

To take partridges with a setting-dog.—There is no method of taking them so good as this. The setting dog is a lusty land-spaniel, taught by nature to hunt partridges more than any other animal whatever, running the fields over with such alacrity and nimbleness as if there was no limit to his fury and desire, and yet by art under such excellent command that in the very height of his career, by a hem or sound of his master's voice, he shall stand, gaze

about him, look in his master's face, and observe his directions, whether to proceed, stand still, or retire; nay, when he is even just upon his prey, that he may even take it up in his mouth, yet his obedience is so framed by art, that instantly he will either stand still or fall down flat on his belly, without daring to make any noise or motion till his master come to him, and then he will proceed in all things to follow his directions.

Having a dog thus qualified by art and nature, take him with you where partridges haunt, there cast off your dog, and by some word of encouragement that he is acquainted with engage him to range, but never too far from you; and see that he beats his ground justly and even, without casting about, or flying now here, now there, which the mettle of some will do, if not corrected and reproved; therefore, when you perceive this fault, you must instantly call him in with a hem, and so check him that he dare not do the like again for that day; so he will range afterwards with more temperance, frequently looking in his master's face, as if he would gather thence whether he did well or ill.

If in your dog's ranging you perceive him stop on a sudden, or stand still, you must then make up to him (for without doubt he hath set the partridge), and as soon as you come to him command him to go nearer to it; but if he go not, but either lies still or stands shaking his tail, and occasionally looks back, then cease from urging him farther, and take your circumference, walking fast, looking straight before the nose of the dog, and thereby see how the covey lies, whether close or straggling.

Then commanding the dog to lie still, draw forth your net, and prick one end to the ground, and spread your net all open, and so cover as many partridges as you can; which done, rush in with a noise and spring up the partridges, which will no sooner rise than they will be entangled in the net. And if you let go the old cock and hen, it will be a means to increase your sport.

Partridges are included in every act of parliament for the preservation of the game; and the penalty for killing a partridge by any unqualified person is five pounds: if such unqualified person kill a partridge, without having taken out an annual certificate from the clerk of the peace for the county in which he resides, (or where such partridge may have been killed,) he is then liable to a farther penalty of twenty pounds; making a forfeiture of twenty-five pounds in the whole.

If a person qualified to kill game in right of his property, (that is, by inheritance of a freehold landed estate of the clear yearly value of one hundred pounds per annum, or a leasehold of one hundred and fifty in his own, or his wife's right) do so at any one time without having taken out an annual certificate as aforesaid, and for which the sum of three guineas has been previously paid, he is then liable to a penalty of twenty pounds. And any person qualified, or unqualified, killing any partridge between the first of February and the first of September, is liable to an additional penalty of five pounds to those already recited, for each offence.

Partridges, in their natural and infant state, accompany the hen in search of food, obey the cluck of the mother, and are protected by the clutch of her wings, in the same manner as chicken, and other domestic fowl. The hen is so instinctively attached to her young, that she will encounter every difficulty, and face death in every form, to insure their safety: although stupidly timid, and rendered almost insensible by her own fears, upon other occasions, yet great sagacity is observable in her endeavours to preserve her offspring. When they are very young, and unable to save themselves by flight; and in all cases of danger, when approached by that fatal enemy the dog; the hen will rise, and lead him on, by short flights, or rather hoverings, of twenty and thirty yards, but just above the ground, till having induced him to follow a sufficient distance from the seat of all her fears, she takes a long and more circuitous rout at her next flight; where, after finding she has completely baffled her pursuer, another effort brings her to her young in safety. When separated by danger (whether the approach of the dog and gun in the sporting season, or by other means) even to a great distance, they are invariably brought again together by the power of calling, which we have already noticed them to possess in so powerful a degree, as to insure a very expeditious recovery of each other.

PARTU'RIENT. *a.* (*parturiens*, Latin). About to bring forth.

PARTURI'TION. *s.* (from *parturio*, Lat.) The state of being about to bring forth (*Brown*).

PA'RTY. *s.* (*partie*, French.) 1. A number of persons confederated by similarity of designs or opinions in opposition to others; a faction (*Locke*). 2. One of two litigants (*Shakspeare*). 3. One concerned in any affair (*Shakspeare*). 4. Persons engaged against each other (*Dryden*). 5. Cause; side (*Dryden*). 6. A select assembly (*Pope*). 7. Particular person; a person distinct from, or opposed to, another (*Taylor*). 8. A detachment of soldiers.

PA'RTY-COLOURED. *a.* (*party* and *coloured.*) Having diversity of colours (*Dryden*).

PA'RTY-JURY. *s.* (In law.) A jury in some trials half foreigners and half natives.

PA'RTY-MAN. *s.* (*party* and *man.*) A factious person; an abettor of a party.

PA'RTY-WALL. *s.* (*party* and *wall.*) Wall that separates one house from the next.

By an act of 14 Geo. III. for better regulating buildings, and preventing mischiefs by fire within the cities of London and Westminster, and parishes within the bills of mortality, it is enacted in what manner buildings of all denominations shall be built; and surveyors are appointed to execute the directions of the act: the principal of which are as follows: buildings are of different rates, as, first, comprehending every church, chapel, or meet-

house; every building for distilling liquors, for making soap, melting tallow, dying, distilling turpentine, casting brass or iron, refining sugar, making glass, or chemical preparations, for sale; and all buildings, not being dwelling-houses, which exceed three clear stories above ground, or which are thirty-one feet high in either front; and dwelling-houses, exceeding the value of 850l. or more than nine squares on the ground plan. Second rate, warehouses whose height exceeds twenty-two feet, and is not thirty-one feet, whose value is more than 300l. and which are more than five squares on the ground plan. Third rate, warehouses not exceeding two clear stories, and more than one story, more than thirteen feet in height; or dwelling-houses which contain three and a half squares on the ground plan, and not valued at more than 150l. Fourth rate, all warehouses under thirteen feet high, and one clear story; and all dwelling-houses under three and a half squares on the ground plan, and under the value of 150l. Those of the fifth rate may be of any dimensions, but must be sixteen feet from any other building, not in the same possession, &c. and four feet from any public way. Those of the sixth rate must be thirty feet from any other building not in the same possession, and eight feet from the public way: those may be made of any dimensions and materials. Those of the seventh rate are under no restraint, excepting that they must not be covered with pitch or tar, &c. The following table shews the dimensions of the party and external walls:

	first rate.		2d rate.		3d rate.		4th rate.		
	Party.	External.	Party.	External.	Party.	External.	Party.	External.	
Foundation or footing	3½	2½	3½	2	3	2	2	2	Bricks in length.
Basement - -	2½	2	2½	1½	2	1½	1½	1½	
Ground floor -	2	2	2	1½	1½	1	1	1	
One pair floor -	2	1½	2	[illegible]	1½	1	1	1	
Second pair ditto -	2	1½	2	1	—	—	—	—	
Third pair ditto -	2	1½	1½	—	—	—	—	—	
Through the roof -	1½	1	1½	—	—	—	—	—	

No party wall is to be cut into without giving twenty-four hours notice to the surveyor, under penalty of 20l. on the master, and 50s. on the workman for every offence.

PA'RVIS. *s.* (French.) A church or church porch (*Bailey*).

PA'RVITUDE. *s.* (from *parvus*, Latin.) Littleness; minuteness: not used (*Glanville*).

PA'RVITY. *s.* (from *parvus*, Lat.) Littleness; minuteness: not used (*Ray*).

PARULIS. (from παρα, near, and ουλον, the gum.) A gum-boil.

PARUS. Titmouse. In zoology, a genus of the class aves, order passeres. Bill very entire, narrow, subcompressed, strong, hard, pointed, and covered at the base with bristles; tongue truncate, bristly at the end; toes divided to the origin, the hind one long and strong. Thirty-one species, scattered over the globe, of which eight are common to our own country. It is a very fertile tribe, laying eighteen or twenty eggs at one hatch: they feed on seeds, fruits and insects, and a few on flesh; most of them are fond of the brains of other birds, which they get at by cleaving the skull of such as they find dead. They are restless, bold, and cruel to birds less than themselves, and will attack such as are three times their own size. The following are chiefly worthy of notice.

1. P. major. Great titmouse. Head black; temples white; nape yellow. Bill, chin, and tail, black; back and wings olive; rump blue-grey; belly greenish-yellow, divided in the middle by a bed of black extending to the vent; quill-feathers dusky, edged partly with blue, partly with white; exterior sides of the outmost tail-feathers white, of the others blueish, inner sides dusky; legs lead-colour. Inhabits Europe, Asia, and Africa, and a native of our own country; five and three-quarters inches long; frequents gardens, but builds in woods, and lays about ten eggs; does much mischief in gardens and orchards by picking off the tender buds of trees: eggs white with rusty spots.

There is another variety, olive-brown, beneath dirty-yellowish; head black; temples cinereous; bill forked, and crossed as in the loxia curvirostra: it has hence been called cross-billed titmouse. A specimen was once killed near Feversham, in Kent.

2. P. cæruleus. Blue titmouse. Quill-feathers blueish, the primaries white on the outer edge; front white; crown blue. Bill blackish; line from the bill to the eyes and one surrounding the temples black; crown black; back yellowish-green; tail blue, the middle-feathers longer; body beneath whitish-yellow; legs and claws black. Inhabits Europe; four and a half inches long; frequents gardens, like the last, and does much injury to fruit-trees by bruising the young buds in search of insects; breeds in holes of walls, and lays from twelve to fourteen small white eggs: a native of our own country.

3. P. palustris. Marsh titmouse. Head black; back cinereous; temples white. There are three other varieties.

β. Wings without the white bands.

γ. Body beneath, and band on the hind-head white.

δ. Crown black; nape yellowish.

Inhabits Europe, and found in our own

country, except the second, which is a native of Louisiana. Rather larger than the last.

4. P. laudatus. Long-tailed titmouse. Crown white; tail longer than the body. Greater wing-coverts black, lesser brown, edged with rosy; four middle tail-feathers black, four edged with grey, the rest varied with black and white. Inhabits Europe; found in our own country, and as far north as Siberia; five and a half inches long; is very destructive to the trees in gardens; forms an oval nest with a hole near the upper end for admission; eggs from ten to seventeen, grey tinged with reddish.

5. P. biarmicus. Bearded titmouse. Rufous; crown hoary; tail longer than the body; head bearded; vent black. Inhabits Europe in marshy places, and found in such in our own country; six and a quarter inches long; suspends its nest between three reeds; eggs reddish-white with small red spots.

6. P. pendulinus. Penduline titmouse. Head ferruginous; ocular band black; quill and tail-feathers brown, edged on each side with ferruginous. Inhabits Europe as far as Siberia; four and a half inches long; frequents moist and marshy places, and builds a nest in the shape of a long purse, with an opening on one side, and attached to the end of some branch of a tree hanging over the water.

7. P. amatorius. Amorous titmouse. Blackish-blue; longitudinal spot on the middle of the wings half yellow and rufous. Inhabits northern Asia; five and a half inches long: is remarkable for the great affection each sex shows towards the other.

PARUTA (Paul), a nobleman of Venice, born in 1540, distinguished himself for his learning and knowledge as a statesman. He filled several great offices and undertook many embassies, which he performed with honour and probity. There are several works of his in Italian, such as Notes upon Tacitus; A history of Venice, from 1513 to 1551. He died in 1598.

PARYPATE HYPATON. (Greek.) Next the principal. In music, the appellation applied by the ancients to the second note of their lowest tetrachord; because it followed the first, or principal. This note corresponded with our C on the second space in the bass.

PARYS, a mountain in the isle of Anglesey, famous for a copper mine, which is not wrought in the common manner of subterraneous mines, but, like a stone quarry, open to day; and the quantity of ore raised is prodigious. The purest part is exported raw to the smelting works at Swansea and other places: the most impure is first calcined and deprived of most of its sulphur on the spot. Quantities of nearly pure copper are obtained from the waters lodged beneath the bed of ore, by the intervention of iron. A lead ore, rich in silver, is also found in this mountain.

PAS. *s.* (French.) Precedence; right of going foremost.

PAS, a town of France, in the department of the Straits of Calais, 12 miles S.W. of Arras. Lon. 2. 40 E. Lat. 50. 9 N.

PAS DE CALAIS, or STRAITS OF CALAIS, a department of France, containing the late provinces of Artois and Boulonnois. Arras is the capital.

PAS (Antoine de), marquis of Feuquieres, a mareschal-de-camp, and an excellent French officer, but he was near 40 years of age before he distinguished himself. He was so greatly disliked by his soldiers, that it was said, "he was the most courageous man alive, since he slept every night in the midst of a hundred thousand enemies."

PASCAL (Blaise), a very eminent French mathematician and philosopher, and one of the greatest geniuses and best writers that country has produced. He was born at Clermont in Auvergne, in the year 1623. His father, Stephen Pascal, was president of the court of aids in his province: he was also a very learned man, an able mathematician, and a friend of Des Cartes. Having an extraordinary tenderness for this child, his only son, he quitted his province, and settled at Paris in 1631, that he might be quite at leisure to attend to his son's education, which he conducted himself, and young Pascal never had any other master. From his infancy Blaise gave proofs of a very extraordinary capacity. He was extremely inquisitive, desiring to know the reason of every thing; and when good reasons were not given him, he would seek for better; nor would he ever yield his assent but upon such as appeared to him well grounded. What is told of his manner of learning the mathematics, as well as the progress he quickly made in that science, seems almost miraculous. His father, perceiving in him an extraordinary inclination to reasoning, was afraid lest the knowledge of the mathematics might hinder his learning the languages, so necessary as a foundation to all sound learning. He therefore kept him as much as he could from all notions of geometry, locked up all his books of that kind, and refrained even from speaking of it in his presence. He could not however prevent his son from musing on that science; and one day in particular he surprised him at work with charcoal upon his chamber floor, and in the midst of figures. The father asked him what he was doing: I am searching, says Pascal, for such a thing; which was just the same as the 32d proposition of the 1st book of Euclid. He asked him then how he came to think of this: it was, said Blaise, because I found out such another thing; and so, going backward, and using the names of bar and round, he came at length to the definitions and axioms he had formed to himself. From this time he had full liberty to indulge his genius in mathematical pursuits. He understood Euclid's Elements as soon as he cast his eyes upon them. At sixteen years of age he wrote a treatise on Conic Sections, which was accounted a great effort of genius; and therefore it is no wonder that Des Cartes, who had been in Holland a long time, upon reading it, should choose to believe that M. Pascal the father was the real author of it. At nineteen he contrived an ad-

mirable arithmetical machine, which would have done credit as an invention to any man versed in science. About this time his health became impaired, so that he was obliged to suspend his labours for the space of four years. After this, having seen Torricelli's experiment respecting a vacuum and the weight of the air, he turned his thoughts towards these objects, and undertook several new experiments, by which he was fully convinced of the general pressure of the atmosphere; and from this discovery he drew many useful and important inferences. He composed also a large treatise, in which he fully explained this subject, and replied to all the objections that had been started against it. As he afterwards thought this work rather too prolix, and being fond of brevity and precision, he divided it into two small treatises, one of which he entitled, A Dissertation on the Equilibrium of Fluids: and the other, An Essay on the Weight of the Atmosphere. These labours procured Pascal so much reputation, that the greatest mathematicians and philosophers of the age proposed various questions to him, and consulted him respecting such difficulties as they could not resolve. Upon one of these occasions he discovered the solution of a problem proposed by Mersenne, which had baffled the penetration of all that had attempted it. This problem was to determine the curve described in the air by the nail of a coach-wheel, while the machine is in motion; which curve was thence called a roullette, but now commonly known by the name of cycloid. Pascal offered a reward of forty pistoles to any one who should give a satisfactory answer to it. No person having succeeded, he published his own at Paris; but under the name of A. d'Ettonville. This was the last work which he published in the mathematics; his infirmities, from a delicate constitution, though still young, now increasing so much, that he was under the necessity of renouncing severe study, and of living so recluse, that he scarcely admitted any person to see him.

After having thus laboured abundantly in mathematical and philosophical disquisitions, he forsook those studies and all human learning at once, to devote himself to acts of devotion and penance. He was not 24 years of age, when the reading some pious books had put him upon taking this resolution; and he became as great a devotee as any age has produced. He now gave himself up entirely to a state of prayer and mortification; and he had always in his thoughts these great maxims of renouncing all pleasure and all superfluity; and this he practised with rigour even in his illnesses, to which he was frequently subject, being of a very invalid habit of body.

Though Pascal had thus abstracted himself from the world, yet he could not forbear paying some attention to what was doing in it; and he even interested himself in the contest between the Jesuits and the Jansenists. Taking the side of the latter, he wrote his Lettres Provinciales, published in 1656, under the name of Louis de Montalte, making the former the subject of ridicule. "These letters," says Voltaire, "may be considered as a model of eloquence and humour. The best comedies of Moliere have not more wit than the first part of these letters; and the sublimity of the latter part of them is equal to any thing in Bossuet. It is true indeed that the whole book was built upon a false foundation; for the extravagant notions of a few Spanish and Flemish Jesuits were artfully ascribed to the whole society. Many absurdities might likewise have been discovered among the Dominican and Franciscan casuists; but this would not have answered the purpose; for the whole raillery was to be levelled only at the Jesuits. These letters were intended to prove, that the Jesuits had formed a design to corrupt mankind; a design which no sect or society ever had, or can have." Voltaire calls Pascal the first of their satirists; for Despréaux, says he, must be considered as only the second. In another place, speaking of this work of Pascal, he says, that "Examples of all the various species of eloquence are to be found in it. Though it has now been written almost 100 years, yet not a single word occurs in it, savouring of that vicissitude to which living languages are so subject. Here then we are to fix the epoch when our language may be said to have assumed a settled form. The bishop of Lucon, son of the celebrated Bussy, told me, that asking one day the bishop of Meaux what work he would covet most to be the author of, supposing his own performances set aside, Bossu replied, The Provincial Letters." These letters have been translated into all languages, and printed over and over again. Some have said that there were decrees of formal condemnation against them; and also that Pascal himself, in his last illness, detested them, and repented of having been a Jansenist: but both these particulars are false and without foundation. It was supposed that father Daniel was the anonymous author of a piece against them, entitled The Dialogues of Cleander and Eudoxus.

Pascal was but about 30 years of age when these letters were published; yet he was extremely infirm, and his disorders increasing soon after so much that he conceived his end fast approaching, he gave up all farther thoughts of literary composition. He resolved to spend the remainder of his days in retirement and pious meditation; and with this view he broke off all his former connections, changed his habitation, and spoke to no one, not even to his own servants, and hardly ever even admitted them into his room. He made his own bed, fetched his dinner from the kitchen, and carried back the plates and dishes in the evening; so that he employed his servants only to cook for him, to go to town, and to do such other things as he could not absolutely do himself. In his chamber nothing was to be seen but two or three chairs, a table, a bed, and a few books. It had no kind of ornament whatever; he had neither a carpet on the floor, nor curtains to his bed. But this did not prevent him from sometimes receiving visits; and when his

friends appeared surprised to see him thus without furniture, he replied, that he had what was necessary, and that any thing else would be a superfluity, unworthy of a wise man. He employed his time in prayer, and in reading the Scriptures; treasuring up such thoughts as this exercise inspired. Though his continual infirmities obliged him to use very delicate food, and though his servants employed the utmost care to provide only what was excellent, he never relished what he ate, and seemed quite indifferent whether they brought him good or bad. His indifference in this respect was so great, that though his taste was not vitiated, he forbad any sauce or ragout to be made for him which might excite his appetite.

Though Pascal had now given up intense study, and though he lived in the most temperate manner, his health continued to decline rapidly, and his disorders had so enfeebled his organs, that his reason became in some measure affected. He always imagined that he saw a deep abyss on one side of him, and he never would sit down till a chair was placed there, to secure him from the danger which he apprehended. At another time he fancied that he had a kind of vision or ecstacy; a memorandum of which he preserved during the remainder of his life on a bit of paper, put between the cloth and the lining of his coat, and which he always carried about him. After languishing for several years in this imbecile state of body and mind, M. Pascal died at Paris the 19th of August 1662, at 39 years of age.

In company, Pascal was distinguished by the amiableness of his behaviour; by great modesty; and by his easy, agreeable, and instructive conversation. He possessed a natural kind of eloquence, which was in a manner irresistible. The arguments he employed for the most part produced the effect which he proposed; and though his abilities intitled him to assume an air of superiority, he never displayed that haughty and imperious tone which may often be observed in men of shining talents. The philosophy of this extraordinary man consisted in renouncing all pleasure, and every superfluity. He not only denied himself the most common gratifications; but he took also without reluctance, and even with pleasure, either as nourishment or as medicine, whatever was disagreeable to the senses; and he every day retrenched some part of his dress, food, or other things, which he considered as not absolutely necessary. Towards the close of his life, he employed himself wholly in devout and moral reflections, writing down those which he deemed worthy of being preserved. The first bit of paper he could find was employed for this purpose; and he commonly set down only a few words of each sentence, as he wrote them merely for his own use. The scraps of paper upon which he had written these thoughts were found after his death filed upon different pieces of string, without any order or connection; and being copied exactly as they were written, they were afterward arranged and published, under the title of Pensées, &c. or Thoughts upon Religion and other Subjects; being parts of a work he had intended against atheists and infidels, which has been much admired. After his death appeared also two other little tracts; the one intitled, The Equilibrium of Fluids; and the other The Weight of the Mass of Air.

The works of Pascal were collected in 5 volumes 8vo, and published at the Hague, and at Paris, in 1779. This edition of Pascal's works may be considered as the first published; at least the greater part of them were not before collected into one body, and some of them had remained only in manuscript. For this collection the public were indebted to the Abbé Bossu, and Pascal was deserving of such an editor. "This extraordinary man," says he, "inherited from nature all the powers of genius. He was a mathematician of the first rank, a profound reasoner, and a sublime and elegant writer. If we reflect, that in a very short life, oppressed by continual infirmities, he invented a curious arithmetical machine, the elements of the calculation of chances, and a method of resolving various problems, respecting the cycloid; that he fixed in an irrevocable manner the wavering opinions of the learned concerning the weight of the air; that he wrote one of the completest works existing in the French language; and that in his Thoughts there are passages the depth and beauty of which are incomparable—we can hardly believe that a greater genius ever existed in any age or nation. All those who had occasion to frequent his company in the ordinary commerce of the world acknowledged his superiority; but it excited no envy against him, as he was never fond of showing it. His conversation instructed, without making those who heard him sensible of their own inferiority; and he was remarkably indulgent towards the faults of others. It may be easily seen by his Provincial Letters, and by some of his other works, that he was born with a great fund of humour, which his infirmities could never entirely destroy. In company, he readily indulged in that harmless and delicate raillery which never gives offence, and which greatly tends to enliven conversation; but its principal object generally was of a moral nature. For example, ridiculing those authors who say, *my book, my commentary, my history*, they would do better (added he) to say, *our book, our commentary, our history*; since there are in them much more of other people's than their own."

The celebrated Bayle, speaking of this great man, says, an hundred volumes of sermons are not of so much avail as a simple account of the life of Pascal. His humility and his devotion mortified the libertines more than if they had been attacked by a dozen of missionaries. In a word, Bayle had so high an idea of this philosopher, that he calls him a paradox in the human species. "When we consider his cha-

racter (says he), we are almost inclined to doubt that he was born of a woman, like the man mentioned by Lucretius: *ut vix humana videatur stirpe creatus.*"

Voltaire, who thought it impossible he could do too much towards limiting the influence of christianity in the world, could not suffer so extraordinary and popular a book as Pascal's Thoughts to be circulated always in their original state. He therefore undertook to corrupt them in a way that exhibits one of the most singular specimens of literary artifice that has ever been imposed upon the world. This artifice consisted in publishing an edition of the Thoughts, with notes by Voltaire himself. In this edition he differently arranged, or rather disarranged the Thoughts themselves, so as to destroy much of their beauty and force. Some new passages were inserted, taken from manuscripts of Pascal to which he had access; and in the introduction of which he has taken care to blend some abominable things of his own invention, for the purpose of making Pascal appear as unprincipled a hypocrite as himself; added to this, he also introduced into the body of the work, and under the running title of Pascal's Thoughts, a discourse intended to bring the immortality of the soul into question! The phraseology of Pascal, too, he has often changed; and various notes are added here and there, in order to make some passages appear laughable, others weak, and others absurd. If infidelity can make a man of genius stoop to such dirty work as this, what honest man must not shudder at the idea of becoming an infidel?

PASCALIA. In botany, a genus of the class syngenesia, order polygamia superflua. Receptacle naked; seeds drupaceous, crowned with a toothed margin; calyx imbricate. One species, a native of Chili, with nearly simple erect stem; toothed, ovate, glabrous leaves; solitary, terminal, yellow flowers.

PASCHAL. *a.* (*pascal*, Fr. *paschalis*, Lat.) 1. Relating to the passover. 2. Relating to Easter.

PASEWALK, a town of Upper Saxony, in Anterior Pomerania. Near it are some ironworks. It is situate on the Ucker, 21 miles W. of Stettin, and 66 S.S.E. of Stralsund. Lon. 13. 57 E. Lat. 53. 27 N.

PASH. *s.* (*paz*, Spanish.) A face (*Shakpeare*).

To PASH. *v. a.* (*perssen*, Dutch.) To strike; to crush (*Dryden*).

PASPALUM. In botany, a genus of the class triandria, order digynia. Calyx two-valved, orbicular; corol the size of the calyx; stigmas pencil-form. Fifteen species, natives of both the Indies and of America.

PASQUIN, a mutilated statue, seen at Rome, in a corner of the palace of the Ursini. It takes its name from a cobler of that city, called Pasquin, famous for his sneers and gibes, and whose shop was the resort of a number of idle people, who diverted themselves with bantering folks as they passed by.

After Pasquin's death, as they were digging up the pavement before his shop, they found a statue of an ancient gladiator, well cut, but maimed, and half spoiled. This they set up, in the place where it was found, at the corner of the deceased Pasquin's shop; and, by common consent, called it by the name of the defunct.

From that time all satires and lampoons are ascribed to this figure, and are put in its mouth or pasted against it; as if they came from Pasquin *redivivus*. Pasquin usually addresses himself to Marforio, another statue in Rome; or Marforio to Pasquin, whom they then make reply.

The answers are usually very short, poignant, and unlucky. When Marforio is attacked, Pasquin comes to his assistance; and Pasquin is assisted by Marforio in his turn; i. e. the people make the statues speak just what they please.

PASQUINADE, or PASQUIL, is properly a satirical libel fastened to the statue of Pasquin.

Hence, by extension, the term becomes used for any satire, lampoon, or sneer upon the public, or upon the ruling powers.

To PASS. *v. n.* (*passer*, French.) 1. To go; to move from one place to another; to be progressive (*Shakspeare*). 2. To go forcibly; to make way (*Dryden*). 3. To make a change from one thing to another (*Temple*). 4. To vanish; to be lost (*Dryden*). 5. To go away progressively (*Locke*). 6. To be at an end; to be over (*Dryden*). 7. To die; to pass from the present life to another state (*Shakspeare*). 8. To be changed by regular gradation (*Arbuthnot*). 9. To go beyond bounds: obsolete (*Shakspeare*). 10. To be in any state (*Ezekiel*). 11. To be enacted (*Clarendon*). 12. To be effected; to exist (*Hooker*). 13. To gain reception; to become current (*L'Estrange*). 14. To be practised artfully or successfully (*Shaks.*). 15. To be regarded as good or ill (*Atterbury*). 16. To occur; to be transacted (*Watts*). 17. To be done (*Taylor*). 18. To heed; to regard: not in use (*Shakspeare*). 19. To determine finally; to judge capitally (*Shakspeare*). 20. To be supremely excellent (*Underwood*). 21. To thrust; to make a push in fencing (*Dryden*). 22. To omit to play (*Prior*). 23. To go through the alimentary duct (*Arbuthnot*). 24. To be in a tolerable state (*L'Estrange*). 25. *To* PASS *away.* To be lost; to glide off (*Locke*). 26. *To* PASS *away.* To vanish.

To PASS. *v. a.* 1. To go beyond (*Hay*). 2. To go through: as, *the horse passed the river.* 3. To spend; to live through (*Collier*). 4. To impart to any thing the power of moving (*Derham*). 5. To carry hastily (*Addison*). 6. To transfer to another proprietor (*Herb.*). 7. To strain; to percolate (*Bacon*). 8. To vent; to pronounce (*Watts*). 9. To utter ceremoniously (*Clarendon*). 10. To utter solemnly (*L'Estrange*). 11. To transmit; to procure to go (*Clarendon*). 12. To put an end to (*Sh.*). 13. To surpass; to excel (*Ezekiel*). 14. To

omit; to neglect (*Shakspeare*). 15. To transcend; to transgress (*Burnet*). 16. To admit; to allow (*Kings*). 17. To enact a law (*Swift*). 18. To impose fraudulently (*Dryden*). 19. To practise artfully; to make succeed (*L'Estrange*). 20. To send from one place to another: as, pass *that beggar to his own parish*. 21. *To* PASS *away*. To spend; to waste (*Ecclus*.). 22. *To* PASS *by*. To excuse; to forgive (*Til*.). 23. *To* PASS *by*. To neglect; to disregard (*Bacon*). 24. *To* PASS *over*. To omit; to let go unregarded (*Dryden*).

PASS. *s*. (from the verb.) 1. A narrow entrance; an avenue (*Shakspeare*). 2. Passage; road (*Raleigh*). 3. A permission to go or come any where (*Shakspeare*). 4. An order by which vagrants or impotent persons are sent to their place of abode. 5. Push; thrust in fencing (*Sh*.). 6. State; condition (*Sidney*).

PASS, in a military sense, a strait and difficult passage, which shuts up the entrance into a country.

PASS, or PASSADE, in fencing, an advance or leap forward upon the enemy. Of these there are several kinds; as passes within, above, beneath, to the right, the left, and passes under the line, &c. The measure of the pass is when the swords are so near as that they may touch one another.

PA'SSABLE. *a*. (*passable*, Fr. from *pass*.) 1. Possible to be passed or travelled through or over (*Shakspeare*). 2. Supportable; tolerable; allowable (*Dryden*). 3. Capable of admission or reception (*Collier*). 4. Popular; well received (*Bacon*).

PASSACAGLIO. (Ital.) In music, a kind of chacone, but somewhat graver and more delicate than that air. See PASSACAILLE.

PASSACAILLE. (French.) A kind of chacone of a tender and slow movement. It is generally written in three crotchets, and begins with the third. There are, however, passacailles in common time beginning with the full bar, though they are very rare.

PASSADE, in fencing. See PASS.

PASSADE, in the manage, is a tread, or way, that a horse makes oftener than once upon the same extent of ground, passing and repassing from one end of its length to the other, which cannot be done without changing the hand, or turning and making a demi-tour at each of the extremities of the ground. Hence it comes that there are several sorts of passades, according to the different ways of turning, in order to part, or put on again and return upon the same piste or tread, which is called closing the passade.

PASSAGE, in the manage. To passage a horse, is to make him go upon a walk or trot upon two pistes or treads, between the two heels, and side-ways, so that his hips make a tract parallel to that made by his shoulders. It is but of late that passaging upon a trot has been used, for formerly the word passage signified walking a horse upon two treads behind the two heels.

A horse is passaged upon two straight lines, along a wall or hedge: he is likewise passaged on his own length upon volts, in going sideways upon a circle, round a center, the semidiameter being above his own length, so that he looks into the volt, and half his shoulders go before the croup. In all passaging, the horse's outward fore-leg must cross or lap a great deal over the inward fore-leg, at every second time of marking. In a passage on a walk, and that on a trot, the motion of the horse is the same, only one is swifter than the other.

PA'SSAGE. *s*. (*passage*, French.) 1. Act of passing; travel; course; journey (*Raleigh*). 2. Road; way (*South*). 3. Entrance or exit; liberty to pass (*Shakspeare*). 4. The state of decay: not in use (*Shakspeare*). 5. Intellectual admittance; mental acceptance (*Digby*). 6. Occurrence; hap (*Shakspeare*). 7. Unsettled state; aptness by condition or nature to change the place of abode (*Temple*). 8. Incident; transaction (*Hayward*). 9. Management; conduct (*Davies*). 10. Part of a book; single place in a writing. *Endroit*, French (*Addison*).

PASSAGE. In stat. 4 Edward III. c. 7, this term is used for the hire a man pays for being transported over any sea or river. Various statutes of a local nature have been passed for regulating the passage of particular rivers. By a statute of Edward IV. the passage from Kent to Calais is restrained to Dover.

PASSAGE (Birds of), are such as only come to us at certain seasons, and then disappear again; being supposed to pass the sea to some other climate.

Among the birds of passage are the stork, swallow, nightingale, martin, woodcock, quail, hooded crow, cuckoo, wry-neck, several species of the pigeon and thrush, snipe, curlew, several species of sand-piper, long-legged plover, land-rail, several species of grebe, divers, terns, mergansers, many species of ducks, &c.

Mr. Pennant remarks, that every species of the genera of curlews, woodcocks, sand-pipers, and plovers, that forsake us in the spring, retire to Sweden, Poland, Prussia, Norway, and Lapland, to breed; and as soon as the young can fly, they return to us again; because the frosts which set in early in those countries deprive them of the means of subsistence; and the dryness and hardness of the ground, in general, during our summer, prevent them from penetrating the earth with their bills in search of worms, which are the natural food of these birds. Of the numerous species of migrating fowl, there are scarcely any that may not be traced to Lapland, a country of lakes, rivers, swamps, and alps, covered with thick and gloomy forests, that afford shelter during summer to these fowls, which in winter disperse over the greatest part of Europe. In those northern regions, by reason of the thickness of the woods, the ground remains moist and penetrable by the woodcocks, and other slender-billed fowl; and for the web-footed birds, the waters afford larvæ without number of the gnat. The days are long, and the light nights are favourable to their collecting this food: to which we may add, that mankind are

very sparingly scattered over that vast northern waste. *British Zoology*, vol. ii. Appendix. See MIGRATION, ORNITHOLOGY.

PASSALUS, in entomology, a tribe in the Fabrician system, belonging to the coleopterous genus DERMESTES, which see.

PASSANT, in heraldry, a term applied to a lion or other animal in a shield, appearing to walk leisurely: for most beasts, except lions, the trippant is frequently used instead of passant.

PASSAROWITZ, a town of Turkey in Europe, in Servia, remarkable for a peace concluded there, in 1718, between the emperor Charles VI. and Achmet III. It is situate near the river Morava, 33 miles E.S.E. of Belgrade, and 44 W. of Orsova. Lon. 21. 16 E. Lat. 45. 6 N.

PASSARVAN, a town of the island of Java, in the East Indies. Lon. 114. 15 E. Lat. 7. 0 S.

PASSAU, an ancient city of Bavaria, capital of a bishopric of the same name, with a fort. The houses are well built, and the cathedral is thought to be the finest in all Germany. It is divided into four parts, namely, the town of Passau Instadt, Illstadt, and the quarter in which is the bishop's palace. The first three are fortified, but the last is only a suburb. It is seared at the confluence of the Inn and Iltz, 62 miles E. by S. of Ratisbon, and 135 W. of Vienna. Lon. 13. 37 E. Lat. 48. 28 N.

PA'SSED. The pret. and part. of *pass*.

PA'SSENGER. *s.* (*passager*, French.) 1. A traveller; one who is upon the road: a wayfarer (*Spenser*). 2. One who hires in any vehicle the liberty of travelling (*Sidney*).

PA'SSENGER FALCON. *s.* A kind of migratory hawk (*Ainsworth*).

PA'SSER. *s.* (from *pass*.) One who passes; one that is upon the road (*Carew*).

PASSERES. In zoology, the name of the sixth order of the Linnéan class aves: thus ordinarily characterised. Bill conic, pointed; legs formed for hopping; toes slender, divided; body slender; flesh of such as feed on grain pure, of such as feed on insects impure; nest formed with wonderful art. They live chiefly in trees and hedges, are monogamous, vocal, and feed their young by thrusting the food down their throats. The order includes seventeen genera, for which see the article ZOOLOGY.

PASSERINA. In b[illegible] a genus of the class octandria, order m[illegible]a. Calyxless; corol four-cleft; sta[illegible]ated on the tube; nut one, covered wi[illegible]ark. Sixteen species; chiefly natives o[illegible]he Cape: a few of the south of Europe.

PASSERO (Cape), anciently called Pachinus, the most southerly point of Sicily. It is a barren island, about a mile round, separated from the rest of Sicily by a strait, half a mile broad. It has a fort, to protect the country from the incursions of the Barbary corsairs. Lon. 15. 22 E. Lat. 36. 35 N.

PASSIBI'LITY. *s.* (*passibilité*, Fr. from *passible*.) Quality of receiving impressions from external agents (*Hakewill*).

PA'SSIBLE. *a.* (*passible*, Fr. *passibilis*, Lat.) Susceptible of impressions from external agents (*Hooker*).

PA'SSIBLENESS. *s.* Quality of receiving impressions from external agents (*Brerewood*).

PASSIFLORA. Passion-flower. Love in a mist. In botany, a genus of the class monadelphia, order pentandria. Calyx five-parted; petals five, inserted into the calyx; nectary a crown of filaments surrounding the stamens and styles; styles three; gourd pedicelled. Forty-six species, all natives of the West Indies or South America. They may be thus divided into tribes.

A. Leaves undivided.
B. Leaves two-lobed.
C. Leaves three-lobed.
D. Leaves many-cleft.

The following are cultivated.

1. P. cærulea. Common or blue passion-flower.
2. P. incarnata. Rose-coloured passion-flower.
3. P. lutea. Yellow passion-flower.
4. P. serratifolia. Notch-leaved passion-flower.
5. P. maliformis. Apple-fruited passion-flower.
6. P. quadrangularis. Square-stalked passion-flower.
7. P. alata. Wing-stalked passion-flower.
8. P laurifolia. Bay-leaved passion-flower, or water melon.
9. P. multiflora. Many-flowered passion-flower.
10. P. rubra. Red-fruited passion-flower.
11. P. muracinja. Moon-shaped passion-flower.
12. P. vespertilis. Bat-winged passion-flower.
13. P. rotundifolia. Round-leaved passion-flower.
14. P. ciliata. Ciliated passion-flower.
15 P. suberosa. Cork-barked passion-flower.
16. P. holosericea. Silky-leaved passion-flower.
17. P. glauca. Glaucous-leaved passion-flower.
18. P. minima. Dwarf passion-flower.

As all the species are natives of warm climates, there are few of them, except P. cærulea, that will succeed in the open air in our own country; and even this requires a warm situation, and often loses its branches in severe winter.

The fruit of the P. maliformis is esteemed a delicacy in the West Indies, where it is served up among the deserts of the islands. The fruit of P. laurifolia has a delicious smell and flavour, and is excellent in quenching thirst, abating heat of the stomach, increasing the appetite, recruiting the spirits, and allaying heat in burning fevers.

PA'SSING. *participial a.* (from *pass*.) 1. Supreme; surpassing others; eminent (*Fairfax*). 2. It is used adverbially to enforce the meaning of another word. Exceeding: as, *passing* fair (*Shakspeare*).

PA'SSINGBELL. *s.* (*passing* and *bell.*) The bell which rings at the hour of departure, to obtain prayers for the passing soul: it is often used for the bell which rings immediately after death (*Daniel. Swift*).

PASSING-NOTES, those notes in the melody, bass, or other parts of a composition, which do not represent the sounds of the chord or harmony, but which are only introduced for the purpose of ornamenting and enriching the effect.

PASSING-SHAKE, a short trill, made *en passant*, in flowing passages of quavers or semiquavers, without breaking the time, or interrupting the natural course of the melody.

These, and indeed most other adventitious graces, must be introduced with great caution and discretion, as well as with much delicacy and propriety of execution.

PA'SSION. *s.* (*passion*, Fr. *passio*, Latin.) 1. Any effect caused by external agency (*Loc.*). 2. Susceptibility of effect from external action (*Bacon*). 3. Violent commotion of the mind (*Milton*) 4. Anger (*Watts*). 5. Zeal: ardour (*Addison*). 6. Love (*Dryden*). 7. Eagerness (*Swift*) 8. Emphatically. The last suffering of the Redeemer of the world (*Acts*).

To PA'SSION. *v. n.* (*passioner*, French.) To be extremely agitated; to express great commotion of mind: obsolete (*Shakspeare*).

PASSION (*passio*, πάθος, or πάθημα) is applied to the different motions and agitations of the soul, according to the different objects that present themselves to the senses. In propriety all those motions whereby the soul is carried towards any thing; as love, ambition, revenge, &c. are rather actions than passions.

Those motions whereby the soul finds itself interrupted in its actions, as grief, &c. are the only real passions.

We find various modifications and impressions of pleasure and pain inseparably annexed, by an established law of nature, to the several judgments we form concerning good and evil, these judgments, with their respective modifications of pleasure or pain annexed, according to the various appearances and relations of the object considered, either as good or evil, present or absent, certain or uncertain, probable or improbable, possible or impossible, and affecting the machine in a certain manner peculiar to such modifications, make what we call the passions.

How, or by what means, this mutual action and communication between soul and body is effected, we are in a great measure ignorant; we have but very obscure and faint notions of any thing prior, or more simple to resolve it into, except the immediate will and agency of the first cause itself.

Malebranche defines the passions to be all those emotions naturally arising in the soul, on occasion of extraordinary motions of the animal spirits, and the blood. In opposition to those motions of the soul which are common to us with pure intelligences, and which he calls natural inclinations.

Though the passions be inseparable from inclinations; and though a man be only capable of sensible love or hatred, because he is capable of spiritual ones; yet does it appear just in that author to distinguish between them. Passions are much stronger and warmer than inclinations; their objects also are different, and so are their causes: in truth, passions and inclinations differ just as much as sense and imagination.

An ingenious writer has accurately distinguished between our affections and our passions; the former, which we apply indiscriminately to all reasonable beings, may most properly signify the desires and inclinations, founded in the reasonable nature itself, and essential to it; such as self-love, benevolence, and the love of truth. These, when aided and strengthened by additional instinctive determinations, are, properly, passions. Those tendencies within us that are merely arbitrary and instinctive, such as hunger and thirst, and the desires between the sexes, we commonly call appetites or passions, indifferently, but seldom or never affections. *Price's Rev. of Morals*, p. 125, &c.

Passion, says another excellent writer, is a kind of medium between a simple affection of the mind and the appetites and sensations of the body. Passion is an affection of the mind which distinguishes it from the appetites of the body, hunger and thirst, and from bodily sensations; and it is attended with a peculiar and extraordinary emotion of the animal spirits, by which it is distinguished from pure affection, and from the several sensations; in all which, though there be some motion of the blood and spirits, yet that motion is natural and regular; whereas in the agitation occasioned by the passions, the spirits are moved after a more vehement and tumultuous manner. *Grove's System of Moral Philosophy*, vol. i. chap. 7.

But Dr. Cogan, a recent very able writer on this interesting branch of enquiry, in giving a general view of the subject, says, by passions, emotions, and affections, we understand those stronger or weaker feelings, with their correspondent effects upon the system, which are excited within us by the perception or contemplation of certain qualities, which belong, or are supposed to belong to the objects of our attention; and which in some respect or other appear interesting to us. In all cases, when the violence of the emotion is not too powerful for the animal œconomy, the feelings or sensations excited are pleasant or unpleasant, according to the nature of the exciting cause, the ideas entertained of it, or the intenseness with which the mind is struck by it. These feelings differ in degrees of strength, according to the apparent importance of their cause; according to certain peculiarities of temperament; and also according to the manner in which the influential qualities are presented to the mind.

One or other of the three terms, passion, emotion, affection, is always employed to express the sensible effects which objects, or ideas concerning them, have upon the mind; but they are so frequently employed in a vague and indeterminate manner, that some difficulty attends the attempt to restore them to their precise and discriminating significations.

The word passion is thus rendered subject to several peculiarities in the application of it. Sometimes it is used in a generic sense, as expressive of every impression made upon the mind. When we speak of the passions in general, or of a treatise on the passions, we mean not to express the stronger impressions alone; the mildest affections are also included: and if we denominate any one to be a person of strong passions, we mean that he is subject to violent transports of joy, or grief, or anger, &c. indiscriminately. In one instance the word is emphatically employed to express suffering; as our Saviour's passion: in another it indicates anger exclusively: thus when it is said of any one that he

is in a passion, it is universally understood that he is very angry. The term passion, and its adverb passionately, often express a very strong predilection for any pursuit, or object of taste; a kind of enthusiastic fondness for any thing. Thus we remark of one person that he has a passion for music, or that he is passionately fond of music; of another that he is passionately fond of painting, &c.

In a sense similar to this is the word also applied to every propensity which operates strongly and permanently upon the mind; as the selfish passions, the generous passions. Yet when we mean to particularize any of these, a different law of phraseology is observed. The word passion is appropriated by the evil propensities which are uniformly operative. Thus we do not say the affection of pride, or of avarice, but the passion. The term affection on the other hand is appropriated by the virtuous propensities; as the social, friendly, parental, filial, affections, &c. though philosophically considered, the relation they bear to the state and workings of the mind is perfectly analogous.

Nor is this capricious latitude of expression confined to common language, where accuracy is not always to be expected. It is also obvious among philosophers themselves; so that scarcely two authors who have written upon the subject of the passions are agreed in their ideas of the terms they employ. Hence it will not be expected that we should dwell long upon them, in this place; we shall, therefore, refer to the individual articles Fear, Grief, Joy, Love, &c. in this work, and for more complete information to Dr. Cogan's very ingenious treatise already quoted.

With regard to the external signs of the passions, we may remark with Lord Kames, that manifold and admirable are the purposes to which they are made subservient by the Author of our nature.

1. The signs of internal agitation displayed externally to every spectator, tend to fix the signification of many words.

2. Society among individuals is greatly promoted by that universal language. Looks and gestures give direct access to the heart; and lead us to select, with tolerable accuracy, the persons who are worthy of our confidence. It is surprising how quickly, and for the most part how correctly, we judge of character from external appearance.

3. After social intercourse is commenced, these external signs, which diffuse through a whole assembly the feelings of each individual, contribute above all other means to improve the social affections. Language, no doubt, is the most comprehensive vehicle for communicating emotions: but in expedition, as well as in power of conviction, it falls short of the signs under consideration; the involuntary signs especially, which are incapable of deceit. Where the countenance, the tones, the gestures, the actions, join with the words in communicating emotions, these united have a force irresistible. Thus all the pleasant emotions of the human heart, with all the social and virtuous affections, are, by means of these external signs, not only perceived but felt. By this admirable contrivance, conversation becomes that lively and animating amusement, without which life would at best be insipid: one joyful countenance spreads cheerfulness instantaneously through a multitude of spectators.

4. Dissocial passions, being hurtful by prompting violence and mischief, are noted by the most conspicuous external signs, in order to put us upon our guard: thus anger and revenge, especially when sudden, display themselves on the countenance in legible characters. The external signs, again, of every passion that threatens danger raise in us the passion of fear; which frequently operating without reason or reflection, moves us by a sudden impulse to avoid the impending danger.

5. These external signs are remarkably subservient to morality. A painful passion, being accompanied with disagreeable external signs, must produce in every spectator a painful emotion: but then, if the passion be social, the emotion it produces is attractive, and connects the spectator with the person who suffers. Dissocial passions only are productive of repulsive emotions, involving the spectator's aversion, and frequently his indignation. This artful contrivance makes us cling to the virtuous, and abhor the wicked.

6. Of all the external signs of passion, those of affliction or distress are the most illustrious with respect to a final cause, and deservedly merit a place of distinction. They are illustrious by the singularity of their contrivance; and also by inspiring sympathy, a passion to which human society is indebted for its greatest blessing, that of providing relief for the distressed. A subject so interesting deserves a leisurely and attentive examination. The conformity of the nature of man to his external circumstances is in every particular wonderful; his nature makes him prone to society; and society is necessary to his well-being, because in a solitary state he is a helpless being, destitute of support, and in his distresses destitute of relief: but mental support, the shining attribute of society, is of too great moment to be left dependent upon cool reason; it is ordered more wisely, and with greater conformity to the analogy of nature, that it should be enforced even instinctively by the passion of sympathy. Here sympathy makes a capital figure, and contributes more than any other means to make life easy and comfortable. But however essential the sympathy of others may be to our well-being, one beforehand would not readily conceive how it could be raised by external signs of distress: for, considering the analogy of nature, if these signs be agreeable, they must give birth to a pleasant emotion leading every beholder to be pleased with human woes: if disagreeable, as they undoubtedly are, ought they not naturally to repel the spectator from them, in order to be relieved from pain? Such would be the reasoning beforehand, and such would be the effect were man purely a selfish being. But the benevolence of our nature gives a very different direction to the painful passion of sympathy, and to the desire involved in it: instead of avoiding distress, we fly to it in order to afford relief; and our sympathy cannot be otherwise gratified than by giving all the succour in our power. Thus external signs of distress, though disagreeable, are attractive: and the sympathy they inspire is a powerful cause, impelling us to afford relief even to a stranger, as if he were our friend or relation.

It is a noted observation, that the deepest tragedies are the most crowded: which in an overly view will be thought an unaccountable bias in human nature. Love of novelty, desire of occupation, beauty of action, make us fond of theatrical representations; and when once engaged, we must follow the story to the conclusion, whatever distress it may create. But we generally become wise by experience; and when we foresee what pain we shall suffer during the course of the representation, is it not surprising that persons of reflection do not avoid such spectacles altogether? And yet one who has scarce recovered from the distress of a

deep tragedy, resolves coolly and deliberately to go to the very next, without the slightest obstruction from self-love. The whole mystery is explained by a single observation: that sympathy, though painful, is attractive; and attaches us to an object in distress, instead of prompting us to fly from it. And by this curious mechanism it is, that persons of any degree of sensibility are attracted by affliction still more than by joy.

PASSIONS, in painting, are the external expressions of the different dispositions and affections of the mind; but particularly their different effects upon the several features of the face: for though the arms, and indeed every part of the body, serve likewise, by their quick, languid, and variously diversified motions, to express the passions of the soul; yet, in painting, this difference is most conspicuous in the face.

As we have given engravings of Le Brun's drawings of the passions, we shall here subjoin the account which he has given of each of these heads. See plates 127 and 128.

1. The effects of *attention* are, to make the eye-brows sink and approach the sides of the nose; to turn the eye-balls toward the object that causes it; to open the mouth, and especially the upper part; to decline the head a little, and fix it without any other remarkable alteration.

2. *Admiration* causes but little agitation in the mind, and therefore alters but very little the parts of the face; nevertheless the eye-brow rises; the eye opens a little more than ordinary; the eye-ball placed equally between the eye-lids appears fixed on the object; the mouth half opens; and makes no sensible alteration in the cheeks.

3. The motions that accompany *admiration with astonishment* are hardly different from those of simple admiration, only they are more lively and stronger marked; the eye-brows more elevated; the eyes more open; the eye-ball farther from the lower eye-lid, and more steadily fixed; the mouth is more open, and all the parts in a much stronger emotion.

4. Admiration begets esteem, and this produces *veneration*, which, when it has for its object something divine or beyond our comprehension, makes the face decline, and the eye-brows bent down; the eyes are almost shut and fixed; the mouth is shut. These motions are gentle, and produce but little alterations in the other parts.

5. Although *rapture* has the same object as veneration, only considered in a different manner, its motions are not the same; the head inclines to the left side; the eye-balls and eye-brows rise directly up; the mouth half opens, and the two corners are also a little turned up: the other parts remain in their natural state.

6. The passion of *desire* brings the eye-brows close together and forwards toward the eyes, which are more open than ordinary; the eye-ball is inflamed, and places itself in the middle of the eye; the nostrils rise up and are contracted towards the eyes; the mouth half opens, and the spirits being in motion give a lively glowing colour.

7. Very little alteration is remarked in the face of those that feel within themselves the *sweetness of joy*, or *joy with tranquillity*. The forehead is serene; the eye-brow without motion, elevated in the middle; the eye pretty open and with a laughing air; the eye-ball lively and shining; the corners of the mouth turn up a little; the complexion is lively; the cheeks and lips are red.

8. *Laughter*, which is produced by joy mixed with surprise, makes the eye-brows rise towards the middle of the eye, and bend towards the sides of the nose; the eyes are almost shut, and sometimes appear wet, or shed tears, which make no alteration in the face; the mouth half open shows the teeth; the corners of the mouth drawn back cause a wrinkle in the cheeks, which appear so swelled as to hide the eyes in some measure; the nostrils are open, and all the face is of a red colour.

9. *Acute pain* makes the eye-brows approach one another, and rise towards the middle; the eye-ball is hid under the eye-brows; the nostrils rise and make a wrinkle in the cheeks; the mouth half opens and draws back: all the parts of the face are agitated in proportion to the violence of the pain.

10. *Simple, bodily pain* produces proportionally the same motions as the last, but not so strong. The eye-brows do not approach and rise so much; the eye-ball appears fixed on some object; the nostrils rise, but the wrinkles in the cheeks are less perceivable; the lips are further asunder towards the middle, and the mouth is half open.

11. The dejection that is produced by *sadness* makes the eye-brows rise towards the middle of the forehead more than towards the cheeks; the eye-ball appears full of perturbation; the white of the eye is yellow; the eye-lids are drawn down, and a little swelled; all about the eyes is livid; the nostrils are drawn downward; the mouth is half open, and the corners are drawn down; the head carelessly leaning on one of the shoulders: the face is of a lead colour; the lips pale.

12. The alterations that *weeping* occasions are strongly marked. The eye-brows sink down towards the middle of the forehead; the eyes are almost closed, wet, and drawn down towards the cheeks; the nostrils swelled; the muscles and veins of the forehead appear; the mouth is shut, and the sides of it are drawn down, making wrinkles on the cheeks: the under lip pushed out, presses the upper one: all the face is wrinkled and contracted; its colour is red, especially about the eye-brows, the eyes, the nose, and the cheeks.

13. The lively attention to the misfortunes of another, which is called *compassion*, causes the eye-brows to sink towards the middle of the forehead; the eye-ball to be fixed upon the object; the sides of the nostrils next the nose to be a little elevated, making wrinkles in the cheeks; the mouth to be open; the upper lip to be lifted up and thrust forwards; the muscles and all the parts of the face sinking down and turning towards the object which excites the passion.

14. The motions of *scorn* are lively and strong. The forehead is wrinkled; the eye-brow is knit; the side of it next the nose sinks down, and the other side rises very much; the eye is very open, and the eye-ball is in the middle; the nostrils rise, and draw towards the eyes, and make wrinkles in the cheeks; the mouth shuts, its sides sinking down, and the under lip is pushed out beyond the upper one.

15. An object despised sometimes causes *horror*, and then the eye-brow knits, and sinks a great deal more. The eye-ball, placed at the bottom of the eye, is half covered by the lower eye-lid; the mouth is half open, but closer in the middle than the sides, which being drawn back, makes wrinkles in the cheeks; the face grows pale, and the eyes become livid; the muscles and the veins are marked.

16. The violence of *terror or fright* alters all the parts of the face; the eye-brow rises in the middle; its muscles are marked, swelled, pressed one against the other, and sunk towards the nose,

which draws up as well as the nostrils; the eyes are very open; the upper eye-lid is hid under the eye-brow; the white of the eye is encompassed with red; the eye-ball fixes toward the lower part of the eye; the lower part of the eye-lid swells and becomes livid; the muscles of the nose and cheeks swell, and these last terminate in a point toward the sides of the nostrils; the mouth is very open, and its corners very apparent; the muscles and veins of the neck stretched; the hair stands on end; the colour of the face, that is, the end of the nose, the lips, the ears, and round the eyes, is pale and livid; and all ought to be strongly marked.

17. The effects of *anger* show its nature. The eyes become red and inflamed; the eye-ball is staring and sparkling; the eye-brows are sometimes elevated and sometimes sunk down equally; the forehead is very much wrinkled, with wrinkles between the eyes; the nostrils are open and enlarged; the lips pressing against one another, the under one rising over the upper one leaves the corners of the mouth a little open, making a cruel and disdainful grin.

18. *Hatred or jealousy* wrinkles the forehead; the eye-brows are sunk down and knit; the eye-ball is half hid under the eye-brows, which turn towards the object; it should appear full of fire, as well as the white of the eye and the eye-lid; the nostrils are pale, open, more marked than ordinary, and drawn backward so as to make wrinkles in the cheeks; the mouth is so shut as to show the teeth are closed; the corners of the mouth are drawn back and very much sunk; the muscles of the jaw appear sunk; the colour of the face is partly inflamed and partly yellowish; the lips pale or livid.

19. As *despair* is extreme, its motions are so likewise; the forehead wrinkles from the top to the bottom; the eye-brows bend down over the eyes, and press one another on the sides of the nose: the eye seems to be on fire, and full of blood; the eye-ball is disturbed, hid under the eye-brow, sparkling and unfixed; the eye-lid is swelled and livid; the nostrils are large, open, and lifted up; the end of the nose sinks down; the muscles, tendons, and veins are swelled and stretched; the upper part of the cheeks is large, marked, and narrow towards the jaw; the mouth drawn backwards is more open at the sides than in the middle; the lower lip is large and turned out; they gnash their teeth; they foam; they bite their lips, which are pale; as is the rest of the face; the hair is straight, and stands on end.

Other French writers have given instructions respecting the expression of the passions, differing much from those of Le Brun. All of them whom we have consulted make so many divisions and subdivisions of passions, that a philosopher cannot follow them in metaphysical theory, nor a painter exhibit their effects upon canvas. Nature therefore must be his guide, particularly in treating those very minute and almost imperceptible differences, by which, however, things very different from each other are often expressed. This is particularly the case with regard to the passions of laughing and crying; as in these, however contrary, the muscles of the face operate nearly in the same manner. As the famous Pietro de Cortona was one day finishing the face of a crying child in a representation of the iron age, with which he was adorning the floor called hot-bath in the royal palace of Pitti, Ferdinand II. who happened to be looking over him for his amusement, could not forbear expressing his approbation, by crying out, "Oh how well this child cries!" To whom the artist: "Has your majesty a mind to see how easy it is to make children laugh? Behold, I'll prove it in an instant." And taking up his pencil, by giving the contour of the mouth a concave turn downwards, instead of the convex upwards which it before had, and with little or no alteration in any other part of the face, he made the child, who a little before seemed ready to burst its heart with crying, appear in equal danger of bursting its sides with immoderate laughter; and then, by restoring the altered features to their former position, he soon set the child a crying again. See farther, The Anatomy of Expression in Painting, by Charles Bell.

PASSION-FLOWER. See PASSIFLORA.

PASSION-WEEK, the week immediately preceding the festival of Easter; so called, because in that week our Saviour's passion and death happened. The Thursday of this week is called Maunday Thursday; the Friday, Good-Friday; and the Saturday, the Great Sabbath.

PA'SSIONATE. *a.* (*passionné*, French.) 1. Moved by passion; feeling or expressing great commotion of mind (*Clarendon*). 2. Easily moved to anger (*Prior*).

To PA'SSIONATE. *v. n.* (from *passion.*) An old word, now obsolete. 1. To affect with passion (*Spenser*). 2. To express passionately (*Shakspeare*).

PA'SSIONATELY. *ad.* (from *passionate.*) 1. With passion; with desire, love, or hatred; with great commotion of mind (*South*). 2. Angrily (*Locke*).

PA'SSIONATENESS. *s.* (from *passionate.*) 1. State of being subject to passion. 2. Vehemence of mind (*Boyle*).

PA'SSIVE. *a.* (*passif*, Fr. *passivus*, Latin.) 1. Receiving impression from some external agent (*South*). 2. Unresisting; not opposing (*Pope*). 3. Suffering; not acting 4. (In grammar.) A verb *passive* is that which signifies passion or the effect of action: as, *doceor*, I am taught (*Clarke*).

PA'SSIVELY. *ad.* (from *passive.*) With a passive nature (*Dryden*).

PA'SSIVENESS. *s.* (from *passive.*) 1. Quality of receiving impression from external agents. 2. Passibility; power of suffering (*D. of Piety*). 3. Patience; calmness (*Fell*).

PASSI'VITY. *s.* (from *passive.*) Passiveness. An innovated word (*Cheyne*).

PASSOVER, πασχα, a solemn feast, celebrated among the Jews, on the fourteenth day of the moon next after the vernal equinox.

This feast was called, by the ancient Latins and Greeks, *pascha*, not from πασχω, I suffer, as Chrysostom, Irenæus, and Tertullian imagine, but from the Hebrew פסח *pesahh*, passage, leap; the design of the feast being to commemorate the destroying angel's passing over the houses of the Israelites, when he entered in, and destroyed the first-born in those of the Egyptians. Exod. xii. 27. Many erroneously imagine, that it was in memory of their passing the Red Sea that the passover was instituted; though it is certain the feast

was held, and had its name, before the Israelites took a step of their way out of Egypt, and consequently several days before their passing the Red Sea.

Besides the passover celebrated on the fourteenth of the first month, there was a second passover held on the fourteenth of the second month after the equinox, instituted by God in favour of travellers, and sick persons, who could not attend at the first, nor be at Jerusalem on the day.

The Greeks, and even some of the catholic doctors, from the thirteenth, eighteenth, and nineteenth chapters of St. John, take occasion to conclude, that Jesus anticipated the day marked for the passover in the law; but the authority of three evangelists seems to evince the contrary. See Whitby's Dissertation on this subject, in an appendix to the fourteenth chapter of St. Mark.

F. Lamy is of opinion, that he did not attend at the passover the last year of his life; which sentiment has drawn upon him abundance of opposers. F. Hardouin maintains, that the Galileans celebrated the passover on one day, and the Jews on another.

Passover denotes also the sacrifice killed.

PASS PAROLE, a command given in the head of an army, and thence communicated to the rear, by passing it from mouth to mouth.

PASS-PAR-TOUT, a master-key; or key that opens indifferently several locks belonging to the same lodge or apartment.

PASSPORT, a licence or letter from a prince or governor, granting liberty and safe-conduct to travel, enter, and go out of, his territories, freely, and without molestation. The passport is properly given to friends, and the safe-conduct to enemies.

The violation of safe-conducts, or passports, expressly granted by the king or his ambassadors to the subjects of a foreign power in time of mutual war, or committing acts of hostility against such as are in amity, league, or truce with us, who are here under a general implied safe-conduct, are breaches of the public faith, without which there can be no intercourse or commerce between one nation and another; and such offences may, according to the writers upon the law of nations, be a just ground of a national war. And it is enacted by the statute 31 Henry VI. c. 4. now in force, that if any of the king's subjects attempt, or offend, upon the sea, or in any port within the king's obeysance, or against any stranger in amity, league, or truce, or under safe-conduct, and especially by attacking his person, or spoiling him, or robbing him of his goods; the lord chancellor, with any of the justices of either the king's bench or common pleas, may cause full restitution and amends to be made to the party injured.

Pasquier takes passport to have been introduced for passe-par-tout. Balzac mentions a very honourable passport given by an emperor to a philosopher in these terms: "If there be any one on land, or sea, hardy enough to molest Potamon, let him consider whether he be strong enough to wage war with Cæsar."

Passport is also used for a licence granted by a prince for the importing or exporting merchandizes, moveables, &c. without paying the duties.

Merchants sometimes procure such passports for certain kinds of commodities; and they are always given to ambassadors and ministers, for their baggage, equipage, &c.

Passport is also a licence obtained for the importing or exporting of merchandizes deemed contraband, and declared such by tariffs, &c. as gold, silver, precious stones, ammunition of war, horses, corn, wool, &c. upon paying duties.

PASSY, a village of France, in the department of Paris, near the town of St. Denys. Here is a considerable manufacture for speedily bleaching cotton and linen cloth.

PAST. *part. a.* (from *pass.*) 1. Not present; not to come (*Swift*). 2. Spent; gone through; undergone (*Pope*).

Past. *s.* Elliptically used for past time (*Fenton*).

Past. *pre.* 1. Beyond in time: *it is* past *the time of history* (*Hebrews*). 2. No longer capable of: *he is* past *learning* (*Hayward*). 3. Beyond; out of reach of: *the ship is* past *cannon-shot* (*Calamy*). 4. Beyond; further than: *we are not* past *the fens* (*Numbers*). 5. Above; more than: *the well was* past *ten feet deep* (*Spenser*).

PASTE. *s.* (*paste*, French.) 1. Any thing mixed up so as to be viscous and tenacious (*Dryden*). 2. Flour and water boiled together so as to make a cement. 3. Artificial mixture, in imitation of precious stones.

To Paste. *v. a.* (*paster*, Fr. from the noun.) To fasten with paste (*Locke*).

PASTEBOARD. *s.* (*paste* and *board.*) Masses made anciently by pasting one board on another: now made sometimes by macerating paper, and casting it in moulds, and sometimes by pounding old cordage and casting it in forms (*Dryden*).

Pa'steboard. *a.* Made of pasteboard (*Mortimer*).

PASTERN OF A HORSE, the part which intervenes between the joint of that name and the coronet of the hoof. This part should be short, especially in middle-sized horses; because long pasterns are weak, and cannot so well endure labour. Some horses indeed have them so long and flexible, that in walking they almost touch the ground with them, which is a great imperfection, and shows the animal unfit for any sort of fatigue.

Pastern-joint, in the manage, the fetlock of a horse: the joint above the pastern, which serves for a second knee in each fore-leg, and a second hough in each hind-leg. A horse is short or long-jointed, according to the shortness or length of the pastern, the short-jointed is the most esteemed.

PASTES for birds: the common food provided for them in aviaries, which may be thus prepared.

Grind half a peck of the finest horse beans, well dried, very fine, and boult them through a fine boulter, such as is used for wheat meal;

or if your stock of birds do not require so great a quantity, use in the following proportion.

Take of the above meal, two pounds; of the best sweet almonds, blanched, one pound; beat these very well in a mortar, and add a quarter of a pound of fresh butter: put them into a copper saucepan, well tinned, mix all well together, and set the pan over a charcoal fire, that the paste may not smell of smoak, and keep continually stirring it all the while it stands upon the fire with a wooden-spoon, that so it may boil gradually, and not burn; then take four yolks of eggs, and a little saffron, and when the butter is melted, having some virgins-honey ready, drop in some by degrees, continually stirring it, that all the ingredients may incorporate.

This being done, take a fine cullender, and strain the compound through, which should be thin, and not in lumps; the remainder of the paste may be beaten in a mortar again, and if it will not pass through the holes, set it upon the fire again, and let it boil gently, and then try it through the cullender, till it comes to such a quantity and quality as is fit for the number of birds you keep. Repeat this as often as you have occasion.

This paste may be mixed with any bird-meat whatever, is a strengthening diet, and will continue good for six months if you pour a little melted clarified honey upon it.

Pastes for fishing are variously compounded, almost according to the angler's own fancy; but there should always be a little cotton wool, shaved lint, or fine flax, to keep the parts of it together, that it may not fall off the hook. White bread and honey will make a proper paste for carp or tench. Fine white bread alone, with a little water, will serve for roach and dace; and mutton suet and soft new cheese for barbels. Strong cheese with a little butter, and coloured yellow with saffron, will make a good winter paste for a chub.

But among all the variety of pastes, there is none so often used as the simple and plain one made with white bread and milk, which requires only clean hands.

The following observations concerning pastes may be of use to a young angler, being all founded on experience:

In September, and all the winter months, when you angle for chub, carp, and bream, with paste, let the bait be as big as a large hazle nut: but for roach and dace, the bigness of an ordinary bean is sufficient.

You may add to any paste, assa-fœtida, oil of ivy, oil of petre, gum ivy, and many other things, which sometimes wonderfully increase your sport.

Paste, in the glass-trade, a kind of coloured glass, made of calcified crystal, lead, and other metallic preparations so as to imitate the natural gems. The basis of these compositions is a pure glass, prepared from pounded quartz, fused with alkali, with the addition of borax and of oxyd of lead. The latter gives density to the glass, a susceptibility of receiving a higher polish, and a greater refractive power, by which the lustre is increased. Different colours are obtained by the addition of various metallic oxyds. The oxyd of gold gives a red; of cobalt, blue; of manganese, purple; of lead, yellow; and of iron, green: and these colours are so rich, as to be equal, or even superior, to those of natural gems, though in lustre, hardness, and durability, the pastes are far inferior. They may be distinguished by their inferior specific gravity, and their softness, which is such that they can be scratched by the knife.

PASTIL or Pastel, among painters, a kind of paste made of different colours ground up with gum-water, in order to make crayons.

Pastil, in pharmacy, is a dry composition of sweet-smelling resins, aromatic woods, &c. sometimes burnt to clear and scent the air of a chamber.

PA'STIME. *s.* (*pass* and *time.*) Sport; amusement; diversion (*Watts*).

PASTINACA. Parsnep. In botany, a genus of the class pentandria, order digynia. Fruit elliptic, compressed, flat; petals involute, entire. Three species.

1. P. lucida. Lucid parsnep. Leaves simple, heart-shaped, lobed, lucid, acutely crenate. A native of the south of Europe.

2. P. opoponax. Rough parsnep. Leaves pinnate; leaflets incomplete at the base on the upper side; root-leaves simple, heart-shaped, acutely crenate; flowers umbelled, yellow, appearing in July: a native of the south of Europe. The inspissated juice of the stem is the opoponax of the shops.

3. P. sativa. Common parsnep. Leaves simply pinnate, downy underneath, sometimes glabrous. Its roots are sweet and nutritious, and in high esteem as an article of food. They possess an aromatic flavour, more especially those of the wild plant, and are exhibited in calculous complaints for their diuretic and sheathing qualities. The parsnep is to be propagated by sowing the seeds in February or March, in a rich mellow soil, which must be deep dug, that the roots may be able to run deep without hindrance.

It is a common practice to sow carrots at the same time, upon the same ground with the parsneps; and if the carrots are designed to be drawn young, there is no harm in it. The parsneps when they are grown up a little, must be thinned to a foot distance, and carefully kept clear of weeds. They are finest tasted just at the season when the leaves are decayed; and such as are desirous to eat them in spring, should have them taken up in autumn, and preserved in sand. When the seeds are to be saved, some very strong and fine plants should be left for it at four feet distance, and towards the end of August, or in the beginning of September, the seeds will be ripe: they must then be carefully gathered, and dried on a coarse cloth. They should always be sown the spring following, for they do not keep well.

PASTO, or St. Juan de Pasto, a town of New Granada, in Popayan, seated in a valley, 120 miles N. by E. of Quito. Lon. 76. 55 W. Lat. 1. 50 N.

PASTOR, originally, signifies one that (*pascit*) feeds. Hence it was anciently used

for a shepherd, or advocate; and is now appropriated to a minister, or one that has the care of souls.

PASTORAL, something that relates to shepherds, *pastores*. The poets represent the innocence of a pastoral life, and pastoral manners, in the most agreeable light. We must not imagine them so beautiful in nature as in their descriptions.

PASTORAL, in poetry, denotes a composition the subject whereof is something in the pastoral, or at least in rural life, and the persons shepherds, or at least rustics.

Most authors, except the English, esteem pastoral of the dramatic kind; and define it a dramatic piece, wherein the persons are clad like nymphs and shepherds, and act their own amours. The scene is always in the fields or the woods; whence Tasso calls pastoral, *favola boscarecria*.

Such are the Pastor Fido, of Guarini; the Aminta, of Tasso; the Sylvia, of Mairet, the French poet; and the Comus, of Milton, &c. Tasso assumes to himself the honour of having invented pastoral; but the first idea of this kind of drama seems to be Beccari's, who made the first attempt of this kind in 1552. But Tasso's Aminta, which did not appear till the year 1573, effacing what had been done by Beccari, the first author was forgot, and Tasso was left as the inventor.

It is certain this kind of pastoral fable, composed according to the rules of the stage, was unknown among the ancients. The Greeks and Latins have indeed introduced shepherds in their eclogues; but these eclogues had nothing theatrical in them; nor were the shepherds ever brought upon the stage.

This kind of dramatic pastoral is as yet but little known among us: nor have we any thing considerable under the title pastorals, but country pieces after the manner of the eclogues or idyllions of the ancients.

Every pastoral, even in this last view, should have a little plot or fable, which may deserve the title of a pastoral scene. It must be simple, and but one; yet not so as to refuse all digressions, provided they be but short. This rule of the plot is every where observed by Virgil.

PA'STORAL. *a.* (*pastoralis*, Latin.) 1. Rural; rustic; beseeming shepherds; imitating shepherds (*Sidney*). 2. Relating to the care of souls (*Hooker*).

PASTORAL-STAFF. See CROSIER.

PASTORALE. (Ital.) In music, an epithet applied to soft rural movements, generally written in twelve quavers, and moving by alternate crotchets and quavers, like the Siciliano.

PA'STRY. *s.* (*pastisserie*, Fr. from *paste*.) 1. The act of making pies (*King*). 2. Pies or baked paste (*Tusser*). 3. The place where pastry is made (*Shakspeare*).

PA'STRY-COOK. *s.* (*pastry* and *cook*.) One whose trade is to make and sell things baked in paste (*Arbuthnot*).

PA'STURABLE, *a.* (from *pasture*.) Fit for pasture.

PA'STURAGE. *s.* (*pasturage*, French.) 1. The business of feeding cattle (*Spenser*). 2. Lands grazed by cattle (*Addison*). 3. The use of pasture (*Arbuthnot*).

PA'STURE. *s.* (*pasture*, Fr.) 1. Food; the act of feeding (*Brown*). 2. Ground on which cattle feed (*Locke*). 3. Human culture; education (*Dryden*).

To PA'STURE. *v. a.* (from the noun.) To place in a pasture.

To PA'STURE. *v. n.* (from the noun.) To graze on the ground (*Milton*).

PASTURE LAND. See HUSBANDRY.

PA'STY. *s.* (*paste*, French.) A pie of crust raised without a dish (*Shakspeare*).

PAT. *a.* (from *pas*, Dutch, *Skinner*.) Fit; convenient; exactly suitable (*Atterbury*).

PAT. *s.* (*patte*, French.) 1. A light quick blow; a tap (*Collier*). 2. A small lump of matter beat into shape with the hand.

To PAT. *v. a.* (from the noun.) To strike lightly; to tap (*Bacon*).

PA'TACHE. *s.* A small ship (*Ainsworth*).

PATACOON. *s.* A Spanish coin worth four shillings and eight pence English (*Ains.*).

PATÆCI, in mythology, images of gods which the Phœnicians carried on the prows of their galleys. Herodotus, lib. iv. calls them παταικοι. The word is Phœnician, and derived from *pethica*, i. e. *titulus*. See Bochart's Chanaan, lib. ii. cap. 3. But Scaliger does not agree. Morin derives it from πιθηκος, monkey, this animal having been an object of worship among the Egyptians, and hence might have been honoured by their neighbours. Mr. Elsner has observed, that Herodotus does not call the patæci, gods; but that they obtained this dignity from the liberality of Hesychius and Suidas, and other ancient lexicographers, who place them at the stern of ships; whereas Herodotus placed them at the prow. Scaliger, Bochart, and Selden have taken some pains about this subject.—Mr. Morin has also given us a learned dissertation on this head in the Memoires de l'Acad. des Inscript. et Belles Lettres, tom. i.; but Mr. Elsner thinks it defective in point of evidence.

PATAGONIA, a country in the most southern part of S. America, bounded on the N. by Paraguay and Chili, and extending 1100 miles on the eastern coast, from Rio de la Plata to the straits of Magellan. The natives of Patagonia are tall, stout, and well made, some of them six feet five and seven inches in height; but their hands and feet are remarkably small. Their colour is a kind of bronze. They are all painted, and clothed nearly in the same manner: the circles round the two eyes are, some white and red, and some red and black. Their teeth are as white as ivory, remarkably even and well set. They have no other clothing than skins, which they wear with the hair inward; and a piece of leather covers their private parts. This country has no timber in the S. parts, though the N. contains an immense quantity, and numerous flocks of cattle. The E. coast is generally low. The principal harbour is that of port St. Julian.

PATANI, a town on the N.E. coast of the peninsula of Malaya, capital of a kingdom of the same name, with a well-defended harbour. The inhabitants have some trade with the Chinese. It is 300 miles N. by W. of Malacca. Lon. 100. 50 E. Lat. 7. 5 N.

PATAY, a town of France, in the department of Loiret, where the English were defeated in 1429, by Joan of Arc. It is 15 miles N.W. of Orleans.

PATAVINITY, among critics, denotes a peculiarity of Livy's diction; derived from Patavium or Padua, the place of his nativity; but wherein this patavinity consists, they are by no means agreed. Asinius Pollio, according to Quintilian, taxed Livy with patavinity. But what he meant by this censure we believe no man can say. Morhof believes it to be a singular turn of expression, and some phrases peculiar to the Paduese. All we certainly know about it is, that it was a fault in the language of Livy, not in the sentiments or manner. In all probability, it is one of those delicacies that are lost in a dead language. Dan. Georg. Morhof published a treatise De Patavinitate Liviana, at Kiel, in 1685, where he explains, very learnedly, the urbanity and peregrinity of the Latin tongue.

PATARA, a town of Lycia, situate on the eastern side of the mouth of the river Xanthus, with a capacious harbour, a temple and an oracle of Apollo, sirnamed Patareus. The god was supposed by some to reside for the six winter months at Patara, and the rest of the year at Delphi.

To **PATCH**. *v. n.* (*pudtzer*, Danish; *pezzare*, Ital.) 1. To cover with a piece sewed on (*Locke*). 2. To decorate the face with small spots of black silk (*Addison*). 3. To mend clumsily; to mend so as that the original strength or beauty is lost (*Dryden*). 4. To make up of shreds or different pieces.

Patch. *s.* (*pezzo*, Ital.) 1. A piece sewed on to cover a hole (*Dryden*). 2. A piece inserted in mosaic or variegated work (*Locke*). 3. A small spot of black silk put on the face (*Suckling*). 4. A small particle; a parcel of land (*Shakspeare*). 5. A paltry fellow: obsolete (*Shakspeare*).

PA'TCHER. *s.* (from *patch*.) One that patches; a botcher.

PA'TCHERY. *s.* (from *patch*.) Botchery; bungling work: not used (*Shakspeare*).

PA'TCHWORK. *s.* (*patch* and *work*.) Work made by sewing small pieces of different colours interchangeably together (*Swift*).

PATE. *s.* The head (*Spenser. South*).

PA'TED. *a.* (from *pate*.) Having a pate. It is used only in composition: as, long-*pated* or cunning; shallow-*pated* or foolish.

PATEE, or **Pattee**, in heraldry, a cross small in the centre, and widening to the extremes, which are very broad.

PATEFA'CTION. *s.* (*patefactio*, Lat.) Act or state of opening (*Ainsworth*).

PATEL, a celebrated French painter, commonly called by his countrymen the French Claude, from his successful imitation of that great master. His works shew a mind that had studied nature with great observation. We have so little knowledge of him, that it is not known in what age he lived.

PATELLA. (*patina*, a dish; so named from its shape). Rotula. The knee pan. A small flat bone, which in some measure resembles the common figure of the heart with its point downwards, and is placed at the fore part of the joint of the knee. It is thicker in its middle part than at its edge. Anteriorly, it is a little convex, and rough for the insertion of muscles and ligaments; posteriorly, it is smooth, covered with cartilage, and divided by a middle longitudinal ridge, into two slightly concave surfaces, of which the external one is the largest and deepest. They are both exactly adapted to the pulley of the os femoris. The edges of this posterior surface are rough and prominent, where the capsular ligament is attached, and below is a roughness at the point of the bone, where the upper extremity of a strong tendinous ligament is fixed, which joins this bone to the tuberosity at the upper end of the tibia. This ligament is of considerable thickness, about an inch in breadth, and upwards of two inches in length. The rotula is composed internally of a cellular substance, covered by a thin bony plate; but its cells are so extremely minute, that the strength of the bone is, upon the whole, very considerable. In new-born children it is entirely cartilaginous. The use of this bone seems to be, to defend the articulation of the joint of the knee from external injury. It likewise tends to increase the power of the muscles which act in the extension of the leg, by removing their direction farther from the center of motion, in the manner of a pulley. When we consider the manner in which it is connected with the tibia, we find that it may very properly be considered as an appendix to the latter, which it follows in all it motions, so as to be to the tibia what the olecranon is to the ulna; with this difference, however, that the rotula is moveable, whereas the olecranon is a fixed process. Without this mobility the rotatory motion of the leg would have been prevented.

Patella. Limpet. In zoology, a genus of the class vermes, order testacea. Animal a limax; shell univalve, subconic, shaped like a bason; without spine. Two hundred and forty species, scattered over the globe; but the greater part found in a fossile state, or thrown up by the tide, and the natural residence unknown. About eight are inhabitants of our own coasts. The genus was known to the ancient Greeks, who employed the animal as an esculent. It is subdivided into the following sections.

A. Furnished with an internal lip; shell entire.

B. With the margin angular, or irregularly toothed.

To this division belongs

1. P. vulgata, or common limpet-shell. Found on our own shores: with about fourteen obsolete angles, and a dilated, acute crenate margin; crown central. It is found

inhabiting the marine rocks of Europe and India; two inches high, three or four wide: in the older shells the margin is nearly even, and the number of ribs irregular. The shell varies in colour and marks, but is generally cinereous, white or reddish, with or without bands.

2. P. badia. Shell subconvex, brown, within bay, with twelve larger rays each surrounded by a rib, and as many smaller ones. Residence unknown: two and three quarters inches long. Shell more or less flat, rarely pellucid, often sprinkled with green or cinereous dots, varied or undulate with grey; sometimes inclining to pale yellow, or liver-colour, or spotted with black; the margin and the crown varied with rays of different colours, the latter often with five rows of blue dots; the bottom with a spatulate liver-colour, or greenish spot surrounded with a single or double differently coloured band; the inner surface often inclining to brown, pale yellow, liver-colour, or grey.

C. With a pointed recurved tip or crown.

3. P. lacustris. Shell very entire, oval, membranaceous, with a nearly central mucronate reflected shell. Inhabits the fresh waters of our own country and of other parts of Europe; from one and a half to two and a half lines long. Shell very thin and brittle, pellucid, white, above convex, beneath concave; crown with a very minute point: the inhabitant with two truncate concealed tentacles, furnished with eyes at the interior angle.

D. Very entire, and not pointed at the tip or crown.

E. With the crown or tip perforated.

PATELLÆ. In conchology, dish-shells, so denominated from their shape: larger in general than the nacre, pearl or mother-of-pearl shells, as oysters, &c.

PATEN. *s.* (*petina*, Latin.) A plate (*Shakspeare*).

PATENT, something that stands open or expanded: thus a leaf is said to be patent when it stands nearly at right angles with the stalk.

PATENT, or LETTERS PATENT, are writings sealed with the great seal of England, by which a man is authorised to do, or to enjoy, any thing which of himself he could not. They are so called on account of their form, being open, with their seal affixed, ready to be exhibited for the confirmation of the authority delegated by them. Letters patent for new inventions are obtained by petition to the crown: they go through many offices, and are usually granted for the term of 14 years, upon condition that the patentee specify his invention or improvement, in such a manner that the public may receive the benefit of it, and may be at liberty to practise or employ such contrivance at the expiration of the exclusive privilege. If, however, it should be found or proved, that the patentee's claims are not supported by originality; or, that he has wilfully disguised his invention, by giving a confused and erroneous specification, the privilege becomes void; and any person is permitted to adopt and make use of it with impunity. Many patents, indeed, are believed to have been surreptitiously obtained by speculative persons; who, from sordid, lucrative motives, swear themselves to be the inventors of things which they have read in foreign books, such as are not in general circulation. These unprincipled adventurers ought to be rigorously examined, whether they have any, and what pretensions to an art or manufacture, of which they profess to be adepts. Thus, it would be easily discovered, that they are plagiarists, and impostors, who evade the provisions made by law. A patent at the lowest cost, and when no opposition is given to it, will, for fees of office, specification, &c. cost for the three branches of the United Kingdom about three hundred pounds. The only complete published repository of specifications of patent inventions is the Repertory of Arts and Manufactures, now extending to several octavo volumes: it is published monthly, and contains descriptions of many highly curious and important inventions. Abridgements of several of these specifications may be seen in the Retrospect of Discoveries, the Monthly Magazine, and a few other periodical publications.

PATENTEE. *s.* One who has a patent.

PATER (Paul), born at Menensdorf, in Hungary, in 1656, and driven from his country when very young, because of his attachment to the protestant religion. The duke of Wolfembuttel made him his librarian; and he became professor of mathematics in the college of Dantzic, where he died in 1724. He was the author of numerous works on philosophy and literature. (*Watkins*).

PATER (John Baptiste), a celebrated landscape painter, born at Valenciennes, in 1695, and the disciple of Anthony Watteau. He had a good taste for colouring, but he neglected the study of nature. He died in 1736. (*Watkins*).

PATERA, among antiquaries, a goblet, or vessel, used by the Romans in their sacrifices, wherein they received the blood of their victims, offered their consecrated meats to the gods, and wherewith they made libations. The word is formed from *pateo*, I am open, *quot pateat*, because it had a great aperture; in contradistinction to bottles, &c.

The patera is an ornament in architecture, frequently introduced in friezes, fascias, and imposts, over which are hung festoons of husks or flowers; and they are sometimes used by themselves, to ornament a space; and in this case it is common to hang a string of husks or drapery over them.

PATERCULUS (Caius Velleius), an ancient Roman historian, who flourished under the emperor Tiberius Cæsar. He commanded the cavalry in Germany under Tiberius, whom he accompanied for nine years successively, and was rewarded with the prætorship. He wrote an epitome of the Roman history in two books, which is extant. He is supposed to have died in the year of Rome 784, and in his 50th year.

One manuscript only has had the luck to be

found, as well of this author among the Latins, as Hesychius among the Greeks: in which, says a great critic of our own nation, "the faults of the scribes are found so numerous, and the defects so beyond all redress, that, notwithstanding the pains of the learned and most acute critics for two whole centuries, these books still are, and are like to continue, a mere heap of errors." No ancient author but Priscian makes mention of Paterculus: the moderns have done him infinitely more justice, and have illustrated him with notes and commentaries. He was first published, from the manuscript of Morbac, by Rhenanus, at Basil, in 1520; afterwards by Lipsius, at Leyden, in 1851; then by Gerard Vossius, in 1639; next by Boeclerus, at Strasburg, in 1642; then by Tysius and others; and, lastly, by Peter Berman, at Leyden, 1719, in 8vo. To the Oxford edition in 1693, 8vo. were prefixed the Annales Velleiani of Mr. Dodwell, which show deep learning and a great knowledge of antiquity.

PATERNAL. *a.* (*paternus*, Latin.) 1. Fatherly; having the relation of a father; pertaining to a father (*Hammond*). 2. Hereditary; received in succession from one's father (*Dryden*).

PATERNITY. *s.* (from *paternus*, Latin.) Fathership; the relation of a father (*Arbuth.*).

PATER-NOSTER, the Lord's prayer, so called from the two first words thereof in Latin. It is also sometimes used for a chaplet or string of beads. And, in architecture, the same term is used for a sort of ornament cut in the form of beads, either oval or round, used on astragals, baguettes, &c.

PATH. *s.* (pað, Saxon.) Way; road; track; a narrow way; any passage (*Addison*).

PATH OF THE VERTEX, a term frequently used by Mr. Flamsteed, in his Doctrine of the Sphere, denoting a circle, described by any point of the earth's surface as the earth turns round its axis. This point is considered as vertical to the earth's centre; and is the same with what is called the vertex or zenith in the Ptolomaic projection.

PATHETIC, whatever relates to the passions, or that is proper to excite or awake them. The word comes from the Greek παθος, passion or emotion. See PASSION.

PATHETIC, in music, something very moving, expressive, or passionate; capable of exciting pity, compassion, anger, or other passions. Thus we speak of the pathetic style, a pathetic figure, pathetic song, &c. The chromatic genus, with its greater and lesser semitones, either ascending or descending, is very proper for the pathetic; as is also an artful management of discords; with a variety of motions, now brisk, now languishing, now swift, now slow. Nieuwentyt speaks of a musician at Venice who so excelled in the pathetic, that he was able to play any of his auditors into distraction: he says also, that the great means he made use of was the variety of motion, &c.

PATHETICALLY. *ad.* In such a manner as may strike the passions (*Dryden*).

PATHETICALNESS. *s.* (from *pathetical*) Quality of being pathetic; quality of moving the passions.

PATHETICI. (from παθος, an affection, because they direct the eyes to express the passions of the mind.) In anatomy, trochleatores. The fourth pair of nerves. They arise from the crura of the cerebellum laterally, and are distributed in the musculus obliquus superior seu trochlearis.

PATHLESS. *a.* (from *path*). Untrodden; not marked with paths (*Sandys*).

PATHOGNOMONIC. (παθογνωμονικος; from παθος, a disease, and γινωσκω, to know). A term given to those symptoms which are peculiar to a disease. They are also termed proper or characteristic symptoms.

PATHOLOGICAL. *a.* (from *pathology*.) Relating to the tokens or discoverable effects of a distemper.

PATHOLOGIST. *s.* (παθος and λεγω.) One who treats of pathology.

PATHOLOGY. (παθολογια; from παθος, a disease, and λογος, a discourse.) The doctrine of diseases. It comprehends nosology, ætiology, symptomatology, and therapia. See MEDICINE.

PATHOS. A Greek term literally signifying passion.

PATHWAY. *s.* (*path* and *way*.) A road; a narrow way to be passed on foot (*Shakspeare*).

PATIBLE. *a.* (from *patior*, Lat.) Sufferable; tolerable.

PATIBULARY. *a.* (*patibulaire*, Fr. from *patibulum*, Lat.) Belonging to the gallows.

PATIENCE. *s.* (*patience*, Fr. *patientia*, Lat.) 1. The power of suffering; calm endurance of pain or labour (*Prior*). 2. The quality of expecting long without rage or discontent (*Matthew*). 3. Perseverance; continuance of labour (*Harte*). 4. The quality of bearing offences without revenge or anger (*Harte*). 5. Sufferance; permission (*Hooker*).

For some of the best remarks on the nature of patience, and on the unreasonable expectations with regard to patience from those that are well of those that are sick, with an account of the constituent parts of patience, and remedies against real impatience, we refer to Jeremy Taylor's Holy Dying, chap. iii. sections 2, 3, 4, and 5.

PATIENCE, in botany. See RUMEX.

PATIENT. *a.* (*patient*, Fr. *patiens*, Latin.) 1. Having the quality of enduring (*Ray*). 2. Calm under pain or affliction (*Dryden*). 3. Not revengeful against injuries. 4. Not easily provoked (*Thessalonians*). 5. Persevering; calmly diligent (*Newton*). 6. Not hasty; not viciously eager or impetuous (*Prior*).

PATIENT. *s.* (*patient*, French.) 1. That which receives impressions from external agents (*Gov. of the Tongue*). 2. A person diseased, under the care of another (*Addison*).

To PATIENT. *v. a.* (*patienter*, French.) To compose one's self: obsolete (*Shaks.*).

PATIENTIA. (from *patior*, to bear or suffer). The herb monk's rhubarb, from its gentle purging qualities. See RHABARBARUM.

PATIENTLY. *ad.* (from *patient.*) 1. Without rage under pain or affliction (*Swift*). 2. Without vitious impetuosity (*Calamy*).

PA'TINE. *s.* (*patina*, Lat.) The cover of a chalice (*Ainsworth.*)

PATKUL (John Reinhold), count, a brave and accomplished man, a native of Livonia, employed to represent the grievances of that province to Charles XI. king of Sweden, in 1689, which commission he discharged with a noble intrepidity and freedom. This remonstrance was construed as rebellious, for which the whole body underwent a process, and Patkul was condemned to lose his estates and honours, and to have his right hand and head cut off. To avoid so cruel a sentence, he fled, and entered into the Russian service. When Charles XIth was dead, and Charles XIIth had deposed Augustus, king of Poland, he obliged that unfortunate prince to deliver Patkul up to him, though he was then invested with the character of envoy extraordinary from the court of Russia. Charles caused him to be broken on the wheel, with every circumstance of ignominy and refined cruelty, in 1707.

PA'TLY. *ad.* (from *pat.*)Commodiously; fitly.

PATMOS, or PATINO, an island of the Archipelago, lying 26 miles S. of the isle of Samos. It is 20 miles in circumference, and one of the most barren in the Archipelago; but is famous for being the place where St. John composed the book of Revelation. A few valleys only are capable of some cultivation; but it abounds with partridges, rabbits, quails, turtles, pigeons, and snipes. In the midst of the island rises a mountain, terminated by the convent of St. John; the abbot of which is the prince of the country, and pays a certain tribute to the grand seignor. The hermitage of the Apocalypse is situate on the side of the mountain between the convent and the port of Scala. It leads to the church of the Apocalypse, which is built against a grotto in a rock, pointed out as the asylum of St. John, during his exile at Patmos. The inhabitants are chiefly Greek Christians, sailors or ship-builders; and have some trade in cotton, and stockings of their own manufacture. The women are generally pretty, but they disfigure themselves by the excessive use of paint. Lon. 26. 24 E. Lat. 37. 24 N.

PATNA, a city of Hindoostan, capital of Bahar, seated on the right bank of the Ganges, opposite the influx of the Gunduck, and fortified with a wall and citadel. In the citadel were confined the prisoners taken in 1764, by Meer Cossim, nabob of Bengal, by whose order they were massacred. The buildings are high, but the streets are narrow. It is a place of considerable trade, 400 miles N.W. of Calcutta. Lon. 85. 0 E. Lat. 25. 35 N.

PATOMAC. See POTOMAC.

PATONCE, in heraldry, is a cross, flory at the ends; from which it differs only in this, that the ends, instead of turning down like a fleur-de-lis, are extended somewhat in the pattee form.

PATRAS, an ancient and flourishing town in the Morea, with a Greek archbishop's see. The Jews, who are one-third of the inhabitants, have four synagogues, and there are several handsome mosques and Greek churches. The Jews carry on a great trade in silk, leather, honey, wax, and cheese. There are cypress trees of a prodigious height, and excellent pomegranates, citrons, and oranges. It has been taken and retaken several times; but the Turks are now masters of it. It is seated on the declivity of a hill, near the sea, 20 miles S.W. of Lepanto. Lon. 21. 45 E. Lat. 38. 17 N.

PATRIA, a town of Naples, in Terra di Lavoro, situate near a lake, to which it gives name, 13 miles N.W of Naples.

PATRIARCH. (*patriarcha*, formed of πατρια, a family, and αρχων, chief.) One of those first fathers who lived towards the beginning of the world; and who became famous by a long line of descendants.

Abraham, Isaac, and Jacob, and his twelve sons, are the patriarchs of the Old Testament. Seth, Enoch, &c. were antediluvian patriarchs.

Long life and a number of children were the blessings of the patriarchs.

The patriarchal government consisted in the fathers of families, and their first-born after them, exercising all kinds of ecclesiastical and civil authority in their respective households: and to this government, which continued till the time of the Israelites dwelling in Egypt, some have ascribed an absolute and despotic power, extending even to the punishment by death. In proof of this, they allege the curse pronounced by Noah upon Canaan, Gen. ix. 25; but it is replied, that in this affair Noah seems to have acted rather as a prophet than a patriarch. Another instance of supposed despotic power is Abraham's turning Hagar and Ishmael out of his family, Gen. xxi. 9, &c.; but this furnishes no evidence of any singular authority vested in the patriarchs, as such, and peculiar to those ages. The third instance alleged to the same purpose is that of Jacob's denouncing a curse upon Simeon and Levi, Gen. xlix. 7. which is maintained by others to be an instance of prophetic inspiration, more than of patriarchal authority. The fourth instance is that of Judah with regard to Tamar, Gen. xxxviii. 24; with regard to which it is observed, that Jacob, the father of Judah, was still living, that Tamar was not one of his own family, and that she had been guilty of adultery, the punishment of which was death by burning, and that Judah on this occasion might speak only as a prosecutor.

PATRIARCH is also used, in christendom, for the bishops in possession of some of the grand sees, independent of the papal jurisdiction.

The patriarchate has been always esteemed the supreme dignity in the church: so that, to rise by degrees, the bishop had only under him the territory of the city whereof he was bishop; the metropolitan commanded a province, and

had for suffragans the bishops of his province; the primate was the chief of a diocese, and had several metropolitans under him; and the patriarch had under him several dioceses, and the primates themselves were under him. But this order was not always observed.

Usher, Pagi, De Marca, and Morinus, attribute the establishment of the grand patriarchates to the apostles. They suppose that the apostles, according to the description of the world then given by geographers, pitched on the three principal cities in the three parts of the known world; viz. Rome, in Europe; Antioch, in Asia; and Alexandria, in Africa: and thus formed a trinity of patriarchs.

Others, far from attributing this institution to the apostles, maintain that the name patriarch was unknown at the time of the council of Nice; and that, for a long time afterwards, patriarchs and primates were confounded together; as being all equally chiefs of dioceses, and equally superior to metropolitans, who were only chiefs of provinces. Hence it is that Socrates gives the title patriarch to all the chiefs of dioceses, and reckons ten of them. In effect, it does not appear that the dignity of patriarch was appropriated to the five grand sees of Rome, Constantinople, Alexandria, Antioch and Jerusalem, till after the council of Chalcedon, in 451. For when the council of Nice regulated the limits and prerogatives of the three patriarchs of Rome, Antioch, and Alexandria, it did not give them the title of patriarchs, though it allowed them the preeminence and privileges thereof. Thus, when the council of Constantinople adjudged the second place to the bishop of Constantinople, who, till then, was only a suffragan of Heraclea, it said nothing of the patriarchate.

Nor is the term patriarchate found in the decree of the council of Chalcedon, whereby the fifth place is assigned to the bishop of Jerusalem; nor did these five patriarchs govern all the churches.

Patriarch is also applied to the chief of several churches in the East, who live out of communion with the Roman church: such are the patriarch of the Armenians, residing in the monastery of St. Gregory; the patriarch of the Abyssinians, called Abuna; the patriarchs of the Cophti, the Jacobites, &c.

PATRIA'RCHAL. *a.* (*patriarchal*, Fr.) 1. Belonging to patriarchs; such as was possessed or enjoyed by patriarchs (*Norris*). 2. Belonging to hierarchial patriarchs (*Ayliffe*).

Patriarchal cross, in heraldry, is that where the shaft is twice crossed; the lower arms being longer than the upper ones.

PATRIARCHATE. Pa'triarchship. *s.* (*patriarchat*, French, from *patriarch*.) A bishopric superiour to archbishoprics (*Ayliffe*).

PA'TRIARCHY. *s.* Jurisdiction of a patriarch; patriarchate (*Brerewood*).

PATRI'CIAN. *a.* (*patricius*, Latin.) Senatorial; noble; not plebeian (*Addison*).

Patrician, a title given, among the ancient Romans, to the descendants of the hundred, or, as some will have it, of the two hundred first senators chosen by Romulus; and by him called *patres*, fathers. Romulus established this order after the example of the Athenians; who were divided into two classes, viz. the *ευπατριδας*, *patricios*, and *δημοτικους*, *populares*. Patricians, therefore, were originally the nobility; in opposition to the plebeians. They were the only persons whom Romulus allowed to aspire to the magistracy; and they exercised all the functions of the priesthood till the year of Rome 495. But the cognizance and character of these ancient families being almost lost and extinguished by a long course of years, and frequent changes in the empire, a new kind of patricians were afterwards set on foot, who had no pretensions from birth, but whose title depended entirely on the emperor's favour. This new patriciate, Zosimus tells us, was erected by Constantine, who conferred the quality on his counsellors, not because they were descended from the ancient fathers of the senate, but because they were the fathers of the republic or of the empire. This dignity in time became the highest of the empire. Justinian calls it *summam dignitatem*.

Patrician deities, *Patricii Dii*, in mythology, were Janus, Saturn, the Genius, Pluto, Bacchus, the Sun, the Moon, and the Earth.

PATRICK (St.), the apostle and tutelar saint of Ireland, born in 377, and died in 460, after having founded the church of Armagh, the metropolitical see of that country. Some works falsely attributed to him were printed at London, in 1656, 8vo.

Patrick (Peter), born at Thessalonica, under the reign of Justinian, who sent him in 534, as embassador to Amalasonta, queen of the Goths: and in 550 to Chosroes, king of Persia, to conclude a peace with him. He was rewarded for these services with the office of master of the palace. We have by him the fragment of a work, entitled The History of Ambassadors, to be found in the collection of Byzantine historians, in 1648, folio.

Patrick (Simon), a learned English bishop, born at Gainsborough, in Lincolnshire, in 1626. He was educated at Queen's college, Cambridge, and afterwards became chaplain to sir Walter St. John. He had the rectory of St. Paul's, Covent-garden: where he continued all the time of the plague in 1665. In 1678, he was made dean of Peterborough. During the reign of king James, the dean preached and wrote against the errors of the church of Rome. The year after the revolution he was appointed bishop of Chichester, and employed, with others newly consecrated, to settle the affairs of the church of Ireland. In 1691, he was translated to the see of Ely, in the room of the deprived bishop Turner. He died in 1707, after having published many works, among which his Paraphrase and Commentaries on the Holy Scriptures, 3 vols. fol. are most distinguished.

PATRIMO'NIAL. *a.* (*patrimonial*, Fr.) Possessed by inheritance (*Temple*).

PATRIMONY. *s.* (*patrimonium*, Latin; *patrimoine*, French.) An estate possessed by inheritance (*Davies*).

PATRIMONY OF ST. PETER, a province of Italy, in the Ecclesiastical State. It is 35 miles long and 30 broad; bounded on the N. by Orvieto, on the E. by Umbria and Sabina, on the S. by Campagna di Roma, and on the S.W. by the sea. Viterbo is the capital.

PATRINGTON, a town in the East riding of Yorkshire, with a market on Saturday. Here the Roman road from the Picts Wall ended. It is seated at the mouth of the Humber, 50 miles S.E. of York, and 191 N. of London. Lon. 0. 8 E. Lat. 53. 49 N.

PATRIOT. *s.* One whose ruling passion is the love of his country (*Tickel*).

PATRIOTISM. *a.* (from *patriot.*) Love of one's country; zeal for one's country.—"Zeal for the public good (says Mr. Addison), is the characteristic of a man of honour, and a gentleman, and must take place of pleasures, profits, and all other private gratifications; that whosoever wants this motive, is an open enemy, or an inglorious neuter to mankind, in proportion to the misapplied advantages with which nature and fortune have blessed him." This love of our country does not import an attachment to any particular soil, climate, or spot of earth, where perhaps we first drew our breath, though those natural ideas are often associated with the moral ones; and, like external signs or symbols, help to ascertain and bind them; but it imports an affection to that moral system of community, which is governed by the same laws and magistrates, and whose several parts are variously connected one with the other, and all united upon the bottom of a common interest. Wherever this love of our country prevails in its genuine vigour and extent, it swallows up all sordid and selfish regards; it conquers the love of ease, power, pleasure, and wealth; nay, when the amiable partialities of friendship, gratitude, private affection, or regards to a family, come in competition with it, it will teach us to sacrifice all, in order to maintain the rights, and promote and defend the honour and happiness of our country. To pursue therefore our private interests in subordination to the good of our country; to be examples in it of virtue, and obedient to the laws; to choose such representatives as we apprehend to be the best friends to its constitution and liberties; and, if we have the power, to promote such laws as may improve and perfect it; readily to embrace every opportunity for advancing its prosperity; cheerfully to contribute to its defence and support; and, if need be, to die for it:—these are among the duties which every man, who has the happiness to be a member of our free and protestant constitution, owes to his country.

The constitution of man is such, that the most selfish passions, if kept within their proper bounds, have a tendency to promote the public good. There is no passion of more general utility than patriotism; but its origin may unquestionably be termed selfish. The love of one's relations and friends is the most natural expansion of self-love: this affection connects itself too with local circumstances, and sometimes cannot easily be separated from them. It often varies, as relationship or place varies; but acquires new power when the whole community becomes its object. It was therefore with singular propriety that the poet said, "Self-love and social are the same."—History furnishes a variety of instances of this exalted virtue, to which individuals of every civilized nation have occasionally aspired. The love of their country, and of the public good, seems to have been the predominant passion of the Spartans. Pedaretus having missed the honour of being chosen one of the three hundred who had a certain rank of distinction in the city, went home extremely pleased and satisfied; saying, "He was overjoyed there were three hundred men in Sparta more honourable than himself."

For more on this subject, see Dr. Parr's Sermon preached at the parish church of Hatton, and Parsons's True Patriot, preached at Leeds.

To PATROCINATE. *v. a.* (*patrocinor*, Lat.) To patronise; to protect; to defend.

PATROCLUS, one of the Grecian chiefs during the Trojan war, son of Menœtius, by Sthenele. In consequence of an accidental murder he fled from Opu, where his father reigned, and retired to the court of Peleus king of Phthia, where he was kindly received, and where he contracted the most intimate friendship with Achilles the monarch's son. When the Greeks went to the Trojan war Patroclus also accompanied them, and he embarked with 10 ships from Phthia. He was the constant companion of Achilles, and when his friend refused to appear in the field, Patroclus imitated his example, and by his absence was the cause of the overthrow of many Greeks. But at last Nestor prevailed upon him to return to the war, and Achilles permitted him to appear in his armour. He soon routed the victorious armies of the Trojans, and obliged them to fly within their walls for safety. Apollo, who interested himself for the Trojans, placed himself to oppose him, and Hector, at the instigation of the god, attacked him. The engagement was obstinate, but at last Patroclus was overpowered by the valour of Hector, and the interposition of Apollo. His arms became the property of the conqueror, but his body was recovered and carried to the Grecian camp, where Achilles received it with the greatest lamentations. His funeral was observed with the greatest solemnity. Upon the death of Patroclus Achilles forgot his resentment, and entered the field to avenge the death of his friend. The patronymic of Actorides is often applied to Patroclus, because Actor was father to Menœtius.

PATROL, in war, a round or march made by the guards or watch in the night-time, to observe what passes in the streets, and to secure the peace and tranquillity of a city or camp. The patrol generally consists of a body of five or six men, detached from a body on guard,

and commanded by a serjeant. They go every hour of the night, from the beating of the tattoo until the reveille: they are to walk in the streets in garrisons, and all over the camp in the field, to prevent disorders, or any number of people from assembling together: they are to see the lights in the soldiers barracks put out, and to take up all the soldiers they find out of their quarters. Sometimes patrols consist of an officer and 30 or 40 men, as well infantry as cavalry; but then the enemy is generally near at hand, and consequently the danger greater.

To PATRO'L. *v. n.* (*patrouiller*, Fr.) To go the rounds in a camp or garrison (*Black*.). 2. To guard a turnpike road, or to clear it of robbers.

PA'TRON. *s.* (*patronus*, Latin.) 1. One who countenances, supports, or protects (*Prior*). 2. A guardian saint (*Spenser*). 3. Advocate; defender; vindicator (*Locke*). 4. One who has donation of ecclesiastical preferment (*Wesley*).

PA'TRONAGE. *s.* (from *patron*.) 1. Support; protection (*Sidney*). 2. Guardianship of saints (*Addison*). 3. Donation of a benefice; right of conferring a benefice.

To PA'TRONAGE. *v. a.* (from the noun.) To patronise; to protect (*Shakspeare*).

PATRONAGE (Arms of), in heraldry, are those on the top of which are some marks of subjection and dependance: thus the city of Paris lately bore the fleurs-de-lis in chief, to show her subjection to the king; and the cardinals, on the top of their arms, bear those of the pope, who gave them the hat, to show that they are his creatures.

PATRO'NAL. *a.* (from *patronus*, Latin.) Protecting; supporting; guarding; defending; doing the office of a patron (*Brown*).

PA'TRONESS. *s.* (feminine of *patron*.) 1. A female that defends, countenances, or supports (*Fairfax*). 2. A female guardian saint. 3. A woman that has the gift of a benefice.

To PA'TRONISE. *v. a.* (from *patron*.) To protect; to support; to defend; to countenance (*Bacon*).

PATRONY'MIC. *s.* (πατρωνυμικος.) Name expressing the name of the father or ancestor: as, *Tydides*, the son of Tydeus (*Broome*).

Patronymics are derived, 1. From the father, as Pelides, i. e. Achilles, the son of Peleus. 2. From the mother, as Philyrides, i. e. Chiron, the son of Philyra. 3. From the grandfather on the father's side, as Æacides, i. e. Achilles, the grandson of Æacus. 4. From the grandfather by the mother's side, as Atlantiades, i. e. Mercury, the grandson of Atlas: and, 5. From kings and founders of nations, as Romulidæ, i. e. the Romans, from their founder, king Romulus.

PATROS, mentioned by Jeremiah and Ezekiel, appears from the context to be meant of a part of Egypt. Bochart thinks it denotes the Higher Egypt: the Septuagint translate it the country of Pathure: in Pliny we have the Nomos Phaturites in the Thebais; in Ptolemy, Pathyris, probably the metropolis. From the Hebrew appellation Patros comes the gentilitious name Pathrusim, Moses.

PATRU (Oliver), a French lawyer, born at Paris, in 1604. He was elected a member of the academy in 1640, on which occasion he made a most elegant oration of thanks, and gave rise to the custom ever after of admissory speeches. He died at Paris, Jan. 16, 1681. Patru was a rigid, though just, censor, insomuch that, when Racine was thought to have made some observations, rather too subtle, upon the works of Boileau, the latter, by a parody on the Latin proverb, *ne sis mihi patruus*, replied, *ne sis mihi* PATRU.

PA'TTEN of a pillar. *s.* Its base (*Ainsw*.).

PA'TTEN. *s.* (*patin*, French.) A shoe of wood with an iron ring, worn under the common shoe by women, to keep them from the dirt (*Camden*).

PA'TTENMAKER. *s.* (*patten* and *maker*.) He that makes pattens.

PATTENSEN, a town of Lower Saxony, in the principality of Calemberg, formerly surrounded with walls, moats, and ramparts. It is six miles S. of Hanover.

PATTEN-SHOE, in farriery, a horse-shoe so called, under which is soldered a sort of half-ball of iron, hollow within. It is designed for hip-shot horses, and put upon a sound foot, to the end that the horse, not being able to stand upon that foot without pain, may be constrained to support himself upon the lame foot, and so counteract the disposition, in the sinews, to contract the haunch.

Many ignorant pretenders, when a horse has been recently lamed in the shoulder, peg the other foot, or set on a patten-shoe to bring the lame shoulder upon a stretch; and some turn them immediately out to grass: but all this, as Gibson observes, is very preposterous, and the direct way to render him incurably lame; a patten-shoe being only necessary in old lamenesses, where the muscles have been a long while contracted.

To PA'TTER. *v. n.* (from *patte*, Fr. the foot.) To make a noise like the quick steps of many feet (*Dryden*).

PA'TTERN. *s.* (*patron*, French; *patroon*, Dutch.) 1. The original proposed to imitation; the archetype; that which is to be copied; an exemplar (*Rogers*). 2. A specimen; a part shown as a sample of the rest (*Swift*). 3. An instance; an example (*Hooker*). 4. Any thing cut out in paper to direct the cutting of cloth, &c.

To PA'TTERN. *v. a.* (*patronner*, French.) 1. To make in imitation of something; to copy (*Shakspeare*). 2. To serve as an example to be followed (*Shakspeare*).

PATTI, a town of Sicily, in Val di Demona, with a bishop's see, seated on the gulf of Patti, 28 miles W. of Messina. Lon. 15. 22 E. Lat. 38. 11 N.

PATTIARY, a town of Hindustan Proper, in the country of Oude, 55 miles N.W. of Canogue, and 55 E.N.E. of Agra. Lon. 79. 45 E. Lat. 27. 33 N.

PATTUN, or PUTTAN, a town of Hin-

dustan Proper, capital of a circar of the same name, in the country of Guzerat. It is 48 miles N. of Amedabad, and 132 S.W. of Oudipour. Lon. 72. 30 E. Lat. 23. 45 N.

PATULCIUS, a sirname of Janus, which he received *a pateo*, because the doors of his temple were always open in the time of war. Some suppose that he received it because he presided over gates, or because the year began by the celebration of his festivals.

PAU, a town of France, in the department of the Lower Pyrenees, with a castle where Henry IV. was born. It is seated on an eminence, at the foot of which runs the Gave, 97 miles S. of Bourdeaux. Lon. 0. 4 W. Lat. 43. 15 N.

PAVAN, or PAVANE, a grave dance used among the Spaniards, and borrowed from them; wherein the performers made a kind of wheel or tail before each other, like that of *pavo*, a peacock; from whence the name is derived.

PAVANÆ LIGNUM. See LIGNUM PAVANÆ.

PAUCI'LOQUY. *s.* (*pauciloquium*, Lat.) Sparing and rare speech.

PAU'CITY. *s.* (*paucitas*, Latin.) 1. Fewness; smallness of number (*Boyle*). 2. Smallness of quantity (*Brown*).

PAUCTON (Alexis John Peter), a learned mathematician, born near Lussan in 1732. He distinguished himself by that great work, the Metrologie, which was a collection of the measures of all countries, and was first published in 1780. He was assisted, in the foreign department, by the astronomer Lalande. In this excellent production are introduced, Observations and Calculations on the ancient Measures, with Dissertations on Population, Agriculture, &c. He was also the author of An Essay on the Screw of Archimedes; and A Theory of the Laws of Nature, published in 1781, in which he attempts to refute the systems of Newton and Nollet. He died in 1799.

To PAVE. *v. a.* (*pavio*, Latin.) 1. To lay with brick or stone; to floor with stone (*Shakspeare*). 2. To make a passage easy (*Bacon*).

PAVEMENT, a layer of stone, or other matter, serving to cover and strengthen the ground of divers places for the more commodious walking on. In London the pavement for coach-ways is chiefly a kind of granite from Scotland: and on the footpath Yorkshire paving is used; courts, stables, kitchens, halls, churches, &c. are paved usually with tiles, bricks, flags, or fire-stones; and sometimes with a kind of free-stone and rag-stone. In France, the public roads, streets, courts, &c. are paved with gres, a kind of free-stone. In Venice, the streets, &c. are paved with brick; churches sometimes with marble, and sometimes with Mosaic work. In Amsterdam, and the chief cities of Holland, they call their brick pavement the burgomaster's pavement, to distinguish it from the stone or flint pavement, which is usually in the middle of the street, serving for the passage of their horses, carts, coaches, and other carriages; the brick borders being designed for the passage of people on foot. Pavements of free-stone, flints, and flags, in streets, &c. are laid dry, that is, are retained in a bed of sand; those of courts, stables, ground-rooms, &c. are laid in mortar of lime and sand, or in lime and cement, especially if there be vaults or cellars underneath. Some masons, after laying a floor dry, especially of brick, spread a thin mortar over it, sweeping it backwards and forwards, to fill up the joints. Thirty-two statute bricks laid flat, pave a yard square; sixty-four edgewise. The square tiles used in paving, called paving bricks, are of various sizes, from six to twelve inches square. Pavements of churches, &c. frequently consist of stones of different colours, chiefly black and white, and of several forms, but chiefly square and lozenges, artfully disposed.

PAVEMENT OF TERRACE, is that which serves for the covering of a platform, whether it be over a vault, or on a wooden floor. Those over vaults are usually stones squared, and bedded in lead. Those on wood are either stones with beds, for bridges; tiles for ceilings in rooms; or layers of mortar made of cement and lime, with flints or bricks laid flat, as is still practised by people in the east and south, on the tops of their houses.

PAVETTA, in botany, a genus of the class tetrandria, order monogynia. Corol one-petalled, funnel-form, superior; stigma curved, berry two-seeded. Seven species, trees or shrubs of China or India.

PAVIA, a fortified town of Italy, in the duchy of Milan, with a celebrated university, and a bishop's see. In the centre of the town is a castle, where the ancient dukes of Milan resided. It has been often taken and retaken, the last time by the Austrians in 1746. It is seated on the Tesno, over which is a bridge, 15 miles S. of Milan. Lon. 9. 15 E. Lat. 45. 13 N.

PAVIER, or PAVER, one who paves or lays with stones.

PAVILION, in architecture, signifies a kind of turret or building, usually insulated, and contained under a single roof; sometimes square, and sometimes in form of a dome: thus called from the resemblance of its roof to a tent. Pavilions are sometimes also projecting pieces, in the front of a building, marking the middle thereof; sometimes the pavilion flanks a corner, in which case it is called an angular pavilion. The Louvre is flanked with four pavilions; the pavilions are usually higher than the rest of the building. There are pavilions built in gardens, commonly called summer-houses, pleasure-houses, &c. Some castles or forts consist only of a single pavilion.

PAVILION, in military affairs, signifies a tent raised on posts, to lodge under in the summer time.

PAVILION, is also sometimes applied to flags, colours, ensigns, standards, banners, &c.

PAVILION, in heraldry, denotes a covering in form of a tent, which invests or wraps up

the armories of divers kings and sovereigns, depending only on God and their sword. The pavilion consists of two parts; the top, which is the chapeau, or coronet; and the curtain, which makes the mantle. None but sovereign monarchs, according to the French heralds, may bear the pavilion entire, and in all its parts. Those who are elective, or have any dependence, say the heralds, must take off the head, and retain nothing but the curtains.

PAVILIONS, among jewellers, the undersides and corners of the brilliants, lying between the girdle and the collet.

To PAVI'LION. *v. a.* (from the noun.) 1. To furnish with tents (*Milton*). 2. To be sheltered by a tent.

PAUL, formerly named SAUL, was of the tribe of Benjamin, a native of Tarsus in Cilicia, a Pharisee by profession: first a persecutor of the church, and afterwards a disciple of Jesus Christ, and apostle to the Gentiles. It is thought he was born about two years before our Saviour, supposing that he lived 68 years, as we read in a homily which is in the sixth volume of St. Chrysostom's works. He was a Roman citizen (Acts xxii. 27, 28.), because Augustus had given the freedom of the city to all the freemen of Tarsus, in consideration of their firm adherence to his interests. His parents sent him early to Jerusalem, where he studied the law at the feet of Gamaliel, a famous doctor (id. xxii. 3.). He made very great progress in his studies, and his life was always blameless before men; being very zealous for the whole observation of the law of Moses (id. xxvi. 4, 5.). But his zeal carried him too far; he persecuted the church, and insulted Jesus Christ in his members (1 Tim. i. 13.); and when the protomartyr St. Stephen was stoned, Saul was not only consenting to his death, but he even stood by and took care of the clothes of those that stoned him (Acts vii. 58, 59.). This happened in the 33d year of the common era, some time after our Saviour's death. The holy scriptures give the detail of St. Paul's conversion and subsequent proceedings very fully. As an orator he appears to have been very distinguished, Longinus himself having spoken of him in terms of approbation. Some very eloquent addresses of his are preserved in the Acts of the Apostles; and out of the twenty-seven inspired books of the New Testament, fourteen were written by Paul. Lord Lyttleton has a very valuable tract, in which the arguments for the truth of Christianity resulting from the conversion of St. Paul are very forcibly stated.

PAUL (Mark), or MARCO PAULO, a Venetian traveller. He penetrated, 1272, as far as the capital of Cublai Chan, of which he published an interesting account. Some authors imagine that Cambalus which he mentions is the town of Pekin. He makes no mention of the great wall of China.

PAUL I, pope after Stephen II. 757, died 10 years after.

PAUL II. (Peter Barbo), pope after Pius II. 1464, permitted the cardinals to wear a purple habit, and the red cap of silk, and the mitre which hitherto had distinguished the sovereign pontiff. He died 1471, aged 54.

PAUL III. (Alexander Farnese), was pope after Clement VII. 1534. In his time began the famous council of Trent, whose first sitting was in 1545. He made a treaty with the Venetians and the emperor against the Turks, and pursued measures of severity against Henry VIII. He was respectable in private life, and at all times anxious to procure concord among the Christian princes. He died 1549, aged 82.

PAUL IV. (John Peter Caraffa), succeeded Marcellus II. 1555, aged near 80. He behaved with great haughtiness, and threatened with his severest displeasure Charles V. because he did not oppose sufficiently vigorous measures against the protestants; and when Elizabeth announced to him her accession, he complained that she had ascended the throne without the concurrence of the holy see, on which all the crowns of Europe were dependent. He died unlamented, 1559.

PAUL V. (Camillus Borghese), was pope after Leo XI. 1605. He was engaged in a dispute with the Venetians, and deserved the gratitude of the Romans for the various embellishments which he introduced, the collections of paintings, sculpture, &c. which he made, and the erection of public fountains and aqueducts. He died 1621, aged 69.

PAUL (Petrowitz), emperor of Russia, son of the great Catherine, was born 1754. He married, 1774, the daughter of the landgrave of Hesse Darmstadt, who died two years after, and for his second wife he took a princess of Wirtemburg, niece to the king of Prussia. He travelled in 1780, and during 14 months visited Poland, Austria, Italy, France, and Holland. On the death of his mother in 1796, he ascended the throne, and took an active part in the general confederacy of Europe, against France. He sent Suwarrow into Italy, where victory followed his steps, and he attacked the northern frontiers of France, in conjunction with the English; but all at once he was reconciled to his enemies, and seizing the property of the English, he banished their unhappy sailors to Siberia. This extravagance was stopped by sudden death. The unfortunate Paul was assassinated in April, 1801, by some of his discontented nobles. The cause of his extraordinary change of politics has been ascribed to the influence of a beautiful mistress, who was sent by the cabinet of Paris to second the labours of diplomatic intrigue. (*Lempriere*).

PAUL'S BETONY. See VERONICA.

PAULA, a Roman lady, born in 347, and descended from the Scipios and the Gracchi. She added to the brightest qualities of the mind, the virtues of Christianity. She founded a monastery at Bethlehem, where she practised the most rigid austerities. She was well versed in the Hebrew scriptures, and was the intimate friend of St. Jerome. She died in 407.

PAULI (Simon), physician to the king of

Denmark. He was the author of the Flora Danica, and of a treatise on the Use and Abuse of Tobacco and Tea. He died in 1682, aged 77.

PAULIANISTS, Paulianistæ, a sect of heretics, so called from their founder Paulus Samosatenus, a native of Samosata, elected bishop of Antioch in 262. His doctrine seems to have amounted to this: that the Son and the Holy Ghost exist in God in the same manner as the faculties of reason and activity do in man; that Christ was born a mere man; but that the reason or wisdom of the Father descended into him, and by him wrought miracles upon earth, and instructed the nations; and finally, that on account of this union of the Divine word with the man Jesus, Christ might, though improperly, be called God. It is also said, that he did not baptize in the name of the Father and of the Son, &c.; for which reason the council of Nice ordered those baptized by him to be re-baptized.

Being condemned by Dionysius Alexandrinus in a council, he abjured his errors, to avoid deposition; but soon after he resumed them, and was actually deposed by another council in 269. He may be considered as the father of the modern Socinians; and his errors are severely condemned by the council of Nice, whose creed differs a little from that now used, under the same name, in the church of England. The creed agreed upon by the Nicene fathers, with a view to the errors of Paulus Samosatenus, concludes thus: τους δε λεγοντας ην ποτε οτε ουκ ην, και πριν γεννηθηναι, ουκ ην, &c. τουτους αναθεματιζει η καθολικη και αποστολικη εκκλησια.—"But those who say he was when he was not, and was not before he was born, the catholic and apostolic church anathematizes." To those who have any veneration for the council of Nice, this must appear a very severe, and perhaps not unjust, censure of the modern Hutchinsonians as well as of the Socinians.

PAULICIANS, a branch of the ancient Manichees, so called from their chieftain, one Paulus, an Armenian, in the seventh century: who with his brother John, both of Samosatena, formed this sect; though others are of opinion, that they were thus called from another Paul, an Armenian by birth, who lived under the reign of Justinian II. A certain zealot, called Constantine, revived, in the seventh century, under the government of Constans, this drooping faction, which had suffered much from the violence of its adversaries, and was ready to expire under the severity of the imperial edicts, and of those penal laws which were executed against its adherents with the utmost rigour. However, the Paulicians, by their number, and the countenance of the emperor Nicephorus, became formidable to all the East.

But the cruel rage of persecution, which had for some years been suspended, broke forth with redoubled violence under the reigns of Michael Curopalates, and Leo the Armenian, who inflicted capital punishment on such of the Paulicians as refused to return into the bosom of the church.

The empress Theodora, tutoress of the emperor Michael, in 845, would oblige them either to be converted, or to quit the empire: upon which, several of them were put to death, and more retired among the Saracens; but they were not all exterminated.

The first religious assembly the Paulicians had formed in Europe is said to have been discovered at Orleans, in 1017, under the reign of Robert; many of whom were condemned to be burnt alive. The ancient Paulicians, according to Photius, expressed the utmost abhorrence of Manes and his doctrine. The Greek writers comprise their errors under the six following particulars. 1. They denied that this inferior and visible world is the production of the supreme Being, and they distinguish the Creator of this world, and of human bodies from the most high God, who dwells in the heavens: and hence some have been led to conceive, that they were a branch of the Gnostics rather than of the Manichæans. 2. They treated contemptuously the virgin Mary, or, according to the usual manner of speaking among the Greeks, they refused to adore and worship her. 3. They refused to celebrate the institution of the Lord's Supper. 4. They loaded the cross of Christ with contempt and reproach; by which we are only to understand, that they refused to follow the absurd and superstitious practice of the Greeks, who paid to the pretended wood of the cross a certain sort of religious homage. 5. They rejected, after the example of the greatest part of the Gnostics, the books of the Old Testament, and looked upon the writers of that sacred history as inspired by the Creator of this world, and not by the supreme God. 6. They excluded presbyters and elders from all part in the administration of the church.—Mosheim's Eccl. Hist. vol. ii. p. 178. 8vo.

PAULINA, the wife of the philosopher Seneca, who attempted to kill herself, when Nero had ordered her husband to die. The emperor however prevented her, and she lived some few years after in the greatest melancholy.

PAULINIA, in botany, a genus of the class octandria, order trigynia. Calyx five-leaved; petals four; nectary four-leaved, unequal; capsule turbinate, triangular, three-celled, the cells one-seeded. Fourteen species; natives of the West Indies and South America.

PAULINUS, a bishop who flourished in the early part of the 7th century. He was the apostle of Yorkshire, having been the first archbishop of York. This dignity seems to have been conferred on him about the year 626. He built a church at Almonbury, and dedicated it to St. Alban, where he preached to and converted the Brigantes. Camden mentions a cross at Dewsborough, which had been erected to him with this inscription, *Paulinus*

hic prædicavit et celebravit. York was so small about this time, that there was not so much as a small church in it in which king Edwin could be baptized. Constantius is said to have made it a bishopric. Pope Honorius made it a metropolitan see. We are told that Paulinus baptized in the river Swale, in one day, 10,000 men, besides women and children, on the first conversion of the Saxons to Christianity, besides many at Halystone. At Walstone in Northumberland, he baptized Segbert king of the East Saxons. Bede says, "Paulinus coming with the king and queen to the royal manor called Ad-Gebrin (now Yeverin), staid there 36 days with them, employed in the duties of catechizing and baptizing. In all this time he did nothing from morning to night but instruct the people, who flocked to him from all the villages and places, in the doctrine of Christ and salvation; and, after they were instructed, baptizing them in the neighbouring river Glen." According to the same Bede, "he preached the word in the province of Lindissi; and first converted the governor of the city of Lindocollina, whose name was Blecca, with all his family. In this city he built a stone church of exquisite workmanship, whose roof being ruined by long neglect or the violence of the enemy, only the walls are now standing." He is also said to have founded a collegiate church of prebends near Southwell, in Nottinghamshire, dedicated to the Virgin Mary. This church he is said to have built when he baptized the Coritani in the Trent.

Assuming the correctness of the above account, which is taken verbatim from the Encyclopædia Britannica, it seems pretty obvious (and it is curious as a matter of fact), that the first archbishop of York baptized men, women, and children, by immersion.

PAULUS ÆMYLIUS, a Roman celebrated for his victories, and sirnamed Macedonicus from his conquest of Macedonia. In the early part of life he distinguished himself by his fondness for military discipline. In his first consulship his arms were directed against the Ligurians, whom he totally subjected. When Perseus, king of Macedonia, declared war against Rome, he was again appointed consul in the 60th year of his age, and in a general engagement near Pydna obtained a complete victory. In two days the conqueror made himself master of all Macedonia, and soon after the fugitive monarch was brought into his presence. Paulus did not exult over his fallen enemy. When he had finally settled the government of Macedonia with ten commissioners from Rome, and after he had sacked 70 cities of Epirus, and divided the booty amongst his soldiers, Paulus returned to Rome, where Perseus with his wretched family adorned the triumph of the conqueror. The riches which the Romans derived from this conquest were immense, and the people were freed from all taxes till the consulship of Hirtius and Pansa; but the conqueror himself was poor, having appropriated for his own use nothing of the treasures except the library of Perseus. He died about 168 years B. C. universally regretted by all the Romans.

PAUNCH. *s.* (*panse*, French; *pantex*, Latin.) The belly; the region of the guts (*Bacon*).

To PAUNCH. *v. a.* (from the noun.) To pierce or rip the belly; to exenterate; to take out the paunch; to eviscerate (*Garth*).

PAVO. Peacock. In zoology, a genus of the class aves, order gallinæ. Bill convex, robust; head covered with revolute feathers; nostrils large; feathers of the rump long, broad, expansile, and covered with eye-like spots. Four species.

1. P. cristatus. Crested peacock. Head with a compressed crest; spurs solitary. Two other varieties.

β Cheeks, throat, belly, and wing coverts white.

γ Body entirely white.

If empire were obtained by beauty, and not by force, the crested peacock, without dispute, would be the king of birds. There is none of the feathered offspring, upon which nature has heaped her treasures with such boundless profusion. Of a tall stature, majestic step, and elegant proportions, every thing belonging to this bird seems to announce a creature of importance and distinction. It is crowned with a fine moveable crest, of the richest hue, which adorns and heightens, without burdening its head. The plumage and tail of this magnificent bird are adorned with colours so rich and various, that no human art can imitate, nor language describe them. When it struts in the sunshine, every moment produces a thousand shades of undulating and evanescent colours, that are continually replaced by other shades, always different, and always admirably beautiful.

But this brilliant plumage, which exceeds the lustre of the finest flowers, fades, like them, every year, and drops in the moulting season; when the poor bird, as if afflicted on account of his loss, and afraid to be seen in so humiliating a condition, always seeks to conceal himself in some gloomy retreat, till the return of spring again restores him his splendid dress. At that season he resumes his station in the open field, to receive the homage due to his beauty; for it is alleged, that nothing so much gratifies his pride as the admiration of his gaudy apparel.

Peacocks, though spread over the greatest part of Europe, came originally from India; where they are found in vast flocks, in some parts of the hither peninsula and the islands of the Indian ocean. So early as the days of Solomon, they were imported into Judea, by the fleets which that monarch equipped upon the Red Sea; and which, in all probability, traded to the coast of Malabar.

Ælian relates, that they were brought into Greece by the barbarians (by whom he means the Asiatics), where they were at first so rare,

that for thirty years after their arrival, they were exhibited at Athens as a show to strangers; and he adds, that multitudes flocked to see them from Lacedemon and Thessaly, who were, each for a certain sum, admitted to the spectacle. This was after the time of Alexander; for that conqueror, though well acquainted with Greece, had never seen them till he marched into India, where he found them flying wild on the banks of the river Hyarotis, and was so struck with their beauty, that he decreed a severe punishment on all who killed or disturbed them. Towards the latter end of his reign they had so greatly multiplied in Greece, that Aristotle, who survived his pupil only two years, speaks of them as birds well known to his contrymen.

The peacock tribe being thus introduced from Asia into Greece, soon spread over the rest of Europe. They have even been carried as far north as Sweden; but in those cold countries they are produced only in small numbers, reared with difficulty, and not without considerable diminution of their beauty. From the great intercourse of the Europeans with America, they are now introduced into almost every part of the new world.

At first the Europeans established them upon the coast of Africa, where they are now domesticated by the princes of those countries, particularly of Congo and Angola. They have been long since transported into Mexico, Peru, and the West India islands, where they never could have appeared but from the aid of man: because, according to a general law of nature, all quadrupeds, and birds of heavy flight, peculiar to the warm climates, cannot, without human assistance, escape from one continent to the other. The short wings, heavy bodies, and embarrassing tail of the peacock, must have for ever debarred him from attempting to fly over such an extent of sea.

When the peacock was first brought into Greece, it was only to gratify the eye with the sight of its plumage. The Romans, however, who were richer, and carried by consequence every excess of luxury to a greater length, soon served them up as one of their most delicate dishes. Hortensius, the orator, is said to have first made the peacock an article of food. His example was soon followed by the epicures in Rome, insomuch that the price paid for these birds soon became exorbitant. The luxurious and æffeminate emperors that succeeded, refining upon the luxury of former times, took a pride in collecting immense dishes of the heads or brains of peacocks; dainties which had nothing to recommend them but the prodigious expence at which they were provided. The same thing may be said of their flesh, which is hard and dry. But probably the Roman cookery, which was carried to a very high degree of perfection, might compensate for these defects. Only the young at present are deemed good eating: the old are seldom dressed, except at some formal and splendid feast. In France, they were formerly served up with all their plumage, merely for show; a purpose for which they are perfectly suited, as their flesh is said to remain unaffected by corruption for a longer period than that of most birds.

It is not till the third year that the males are at their full size and vigour. Then their feathers are all in perfection; and the superfluous nourishment, having nothing farther to add to the individual, is employed in reproducing the species. The female, soon after fecundation, lays her eggs in some retreat, where she may be concealed from the male, who would destroy them were he to discover her charge. In these northerly climates she lays only from four to five eggs; but in Greece, according to Aristotle, she produced twelve, and in India sometimes lays twice that number, so powerfully does climate operate upon the fertility of birds of this, and perhaps of every genus. In these countries also, the female, when deprived of the male, will produce barren eggs, which by the ancients were denominated zephyrian, as supposing them to be the result of the warm stimulus of the vernal gales.

The young, when excluded, are fed with crumbs of bread, cheese, and grass. The ancients paid very particular attention to the rearing of these birds: they put each of the young ones into a separate cage, to prevent them from fighting. The male does not recognize the young for his own till after they have got the crest; before that time he chaces them like strangers.

The peacock, like all other birds of the poultry kind, feeds upon grain; but it is extremely capricious, and there is hardly any kind of food which it will not, at times, covet and pursue. Insects and tender plants are often eagerly sought for, at a time when it has a sufficiency of its natural food at hand. In the indulgence of these irregular appetites, walls cannot easily confine it. It strips the tops of houses of their tiles and thatch; it lays waste the labours of the gardener; roots up his choicest seeds; and nips his favourite flowers in the bud. Thus, its beauty but ill compensates for the mischief it occasions; and many of the more homely looking fowls are very deservedly preferred to it.

The cry of the peacock, which is harsh and disagreeable, is rendered still more intolerable, by the time in which it is most frequently uttered. It perches upon the house tops, and, in the dead of night, often interrupts the repose of other animals by those hideous screams, from which Varro alleges it derived its Latin name. (Volucres pleræque a suis vocibus appellatæ, ut hæc, *upupa, cuculus, ulula, pavo.* De lingua Latina, Lib. iv.) According to Ælian's account, adopted by Willoughby, the peacock lives no less a period than an hundred years. Aristotle and Pliny, however, assign it the more moderate space of twenty-five, a longevity which accurate observations would probably confirm.

As it is only in India that these birds are found in their natural freedom; so it is there

also that the inhabitants have invented a method of hunting them. Although they are spread in vast flocks over the fields, there is no possibility of approaching them by day, so quickly do they penetrate the thickets, where they cannot be pursued. In the kingdom of Cambaya, where this diversion is practised, the fowler observes the trees upon which they perch; and in the night approaches them with a kind of banner, upon each side of which a peacock is painted to the life. A lighted torch is placed upon the top of this decoy; and the peacock, when disturbed, flies to what it takes for another bird of its kind, and is caught in a noose placed there for that purpose.

Of the origin of the white varieties of this species we are ignorant. The hare and the ermine become in some countries white from the coldness of the climate, but resume their natural colour when transported into a warmer latitude. This fact however does not hold with respect to the white peacock, for it produces a constant race of the same colour; and its eggs, though transported into the most sultry climes, will yield birds of the parent hue.

This whiteness of plumage has justly been deemed by naturalists the effect of migration. Norway, and the other countries of the north, have given birth to this species, for there they are found wild; and from these frozen regions they annually retire to spend the winter in Germany. Whether this species was introduced into the north of Europe by a voluntary migration from Asia, or by the intervention of man, is a point which cannot now be determined. It is probable that it was wholly unknown to the ancients, since no mention is made of it in any of their writings; and it is to be presumed also, that its migration into the north is not very ancient, for, though now common there, it was deemed extremely rare by all former naturalists.

The feathers of these varieties, though white, still retain some shades of their primitive lustre. Those of the tail, particularly, show some faint traces of that beautiful eye, which sparkles at the end of each feather in the common variegated species. It is probable, that were this bird removed into the milder regions of Asia, its original colours would return in a few generations.

2. P. bicalcaratus. Iris peacock. Brown; head subcrested; spurs two. Bill blackish, the upper mandible from the nostrils to the tip red; irides yellow; crown black; face naked; temples white; neck shining brown with black lines; upper part of the back, shoulders, and wing coverts brown, with yellowish stripes, the feathers near the tip with a large purple-gold spot; lower part of the back and rump spotted with white; body beneath brown, with transverse black streaks; quill-feathers dusky; legs brown. Inhabits China: rather larger than the pheasant.

3. P. Thibetanus. Thibet peacock. Cinereous streaked with blackish; head subcrested; spurs two; wing-coverts, back, and rump, grey, with small white spots, besides which the coverts have shining blue spots. Inhabits Thibet; twenty-five and a half inches long.

4. P. muticus. Japan peacock. Head with a subulate crest; spurless; body blue mixed with green; head and neck greenish, with blue spots, and a white streak down the middle. Inhabits Japan: size that of P. cristatus.

PAVO, in astronomy, a constellation of the southern hemisphere, unknown to the ancients, and not visible in our latitudes. It consists of 14 stars, which, arranged according to their magnitudes, are 0, 1, 3, 5, 4, 1.

PAVONIA, in botany, a genus of the class monadelphia, order polyandria. Calyx double, the outer one many-leaved; stigmas ten; capsules five, two-valved, one-seeded. Fifteen species, natives of the Indies; and several of these formerly, but erroneously, ranged under the genus hibiscus, as some few were under urena.

PAVOR, an emotion of the mind which received divine honours among the Romans. Tullus Hostilius, the third king of Rome, was the first who built her temples, and raised altars to her honour, as also to Pallor, the goddess of paleness.

PAUPER. *s.* (Latin.) A poor person; one who receives alms.

PAUSANIAS. There were many of this name, the most remarkable of whom are the following: 1. A Spartan general, who greatly signalized himself at the battle of Platæa, against the Persians. He was afterwards set at the head of the Spartan armies, and extended his conquests in Asia, but his haughtiness created him many enemies. Pausanias was dissatisfied with his countrymen, and he offered to betray Greece to the Persians, if he received in marriage, as the reward of his perfidy, the daughter of their monarch. His intrigues were discovered by means of a youth intrusted with his letters to Persia. The letters were given to the ephori of Sparta, and the perfidy of Pausanias laid open. He fled for safety to a temple of Minerva, which was surrounded with heaps of stones, the first of which was carried there by his own mother. He was starved to death in the temple, and died about 471 years before the Christian era. —2. Another at the court of king Philip of Macedon, who stabbed Philip as he entered a public theatre. After this bloody action, he attempted to make his escape, but was pursued by Attalus and Perdiccas, friends of Philip, who fell upon him, and immediately dispatched him. Some suppose that Pausanias committed this murder at the instigation of Olympias, the wife of Philip, and of her son Alexander.—3. A celebrated orator and historian, who settled at Rome A. D. 170, where he died in a very advanced age. He wrote an history of Greece in ten books, in the Ionic dialect, in which he gives with great precision and geographical knowledge an account of the situation of its different cities, their antiquities, and the several curiosities which they contained. He has

also interwoven mythology, in his historical account, and introduced many fabulous traditions and superstitious stories.—4. There was another Pausanias, a native of Cæsaræa, in Cappadocia, who wrote some declamations, and who is often confounded with the historian of that name.

PAUSE. *s.* (*pausa*, low Latin; παυω.) 1. A stop; a place or time of intermission (*Addison*). 2. Suspense; doubt (*Shakspeare*). 3. Break; paragraph; apparent separation of the parts of a discourse (*Locke*). 4. Place of suspending the voice marked in writing, thus —.

PAUSES or RESTS, in speaking or reading, are a total cessation of the voice, during a perceptible, and in many cases a measurable space of time. There are two kinds of pauses; first, emphatical pauses; and next, such as mark the distinctions of sense. See READING.

PAUSE, in music, a mark, or character, consisting of a curve drawn over a dot, and signifying that the note, or the rest, over which it is placed, is to be continued beyond the regular time. The exact length of the pause is not dictated by any stated rule, but left to the judgment, taste, and feeling of the performer, who sometimes is licensed by the words *ad libitum* to introduce extempore embellishments. See MUSIC.

To PAUSE. *v. n.* 1. To wait; to stop; not to proceed; to forbear for a time (*Milton*). 2. To deliberate (*Knolles*). 3. To be intermitted (*Tickel*)

PAU'SER. *s.* (from *pause.*) He who pauses; he who deliberates (*Shakspeare*).

PAUSIAS, a painter of Sicyon, who lived about 350 years B.C. He was the first who understood how to apply colours to wood or ivory, by means of fire. He made a beautiful painting of his mistress Glycere, which was bought by Lucullus for two talents.

PAUSUS. In zoology, a genus of the class insecta, order coleoptera. Antennas two-jointed; the upper joint very large, inflected, hooked, pedicellate; head pointing forwards with a convex jugular triangle; thorax narrow, unequal, scutellate; shells flexile, deflected, truncate; fore-feet placed at the fore-part of the breast; thighs with minute appendages, tarsi four jointed. Five species all exotics: the following are chiefly entitled to notice.

1. P. sphærocerus. Head horned; club globular; shells shorter than the abdomen, punctured; shanks dilated at the tip: body polished, chesnut; thorax the same breadth as the head: wings shining, of changeable violet. It inhabits Sierra Leona; wanders about in the night during the months of January and February; and becomes blind or benumbed on the approach of light: the globes of the antennas give a kind of phosphoric light in the dark.

2. P. microcephalus. Head unarmed; body an oblong sphere, dark chesnut-brown; shells as long as the body, not punctured; shanks linear; shield two-parted; pivots of the antennas black, upper joint of the club much larger than the head; wings sooty. Inhabits the Bananas and neighbouring islands.

PAW. *s.* (*pawen*, Welsh; *patte*, French.) 1. The foot of a beast of prey (*More*). 2 Hand: in contempt (*Dryden*).

To PAW. *v. n.* (from the noun.) To draw the forefoot along the ground (*Pope*)

To PAW. *v. a.* 1. To strike with a drawn stroke of the fore-foot (*Tickel*). 2. To handle roughly. 3. To fawn; to flatter (*Ainsworth*).

To PAW THE GROUND. A horse is said to paw the ground, when his leg being either tired or painful, he does not rest it upon the ground. Spirited horses are also said to paw the ground when they shew an impatience to go on by throwing out one of the fore feet repeatedly.

PA'WED. *a.* (from *paw.*) 1. Having paws. 2. Broad-footed.

PAWLE, in a ship, a small piece of iron bolted to one end of the beams of the deck, close to the capstan; but yet so easily, as that it can turn about. Its use is, to stop the capstan from turning back, by being made to catch hold of the whelps: they therefore say, heave a pawle; that is, heave a little more, for the pawle to get hold of the whelps; and this they call pawling the capstan.

PAWN. *s.* (*pand*, Dutch; *pan*, French.) 1. Something given to pledge as a security for money borrowed or promise made (*Howel*). 2. The state of being pledged (*Shakspeare*). 3. A common man at chess (*Cowley*).

PAWN, a pledge lodged for the security of the payment of a sum of money borrowed. As the party that pawns the goods has a general property therein, they cannot be forfeited by the person that has them in pawn, for any offence of his: neither can they be taken in execution for his debt: on the other hand, where goods are repawned for money, if after judgment is obtained against the pawner for debt, the goods in the pawnee's hands are not liable to execution until such time as the money lent is paid to the pawnee. He that borrows money on a pawn is to have again the pledge, when he repays the same, or he may bring an action for detaining it; and his very tender of the money revests the special property in him. Likewise it has been held, that where a broker refuses, on tendering the money, to redeliver the goods, he thereupon shall be indicted. In case goods are pawned for lent money, and no day fixed for their redemption, they are said to be redeemable at any time during the pawner's life; and though they may not be redeemed after his death, they may after the death of the pawnee. Where the pawn is redeemable on a certain day, it must be strictly observed, or upon failure of payment it may be sold. Also it is the common practice of the brokers, when no day is fixed for redemption, not to stay longer than a year for their money, at the expiration of which time they usually sell the goods. See also 39 and 40 Geo. III. c. 99.

To PAWN. *v. a.* (from the noun.) To pledge; to give in pledge (*Shakspeare*).

PA'WNBROKER. *s.* (*pawn* and *broker.*) One who lends money upon pledge (*Arbuthnot*).

PAX, an allegorical divinity among the ancients. The Athenians raised her a statue, representing her as holding Plutus, the god of wealth, in her lap, to intimate that peace gives rise to opulence. She was represented among the Romans with the horn of plenty; and also carrying an olive branch in her hand. The emperor Vespasian built her a celebrated temple at Rome, which was consumed by fire in the reign of Commodus.

PAXU, an island in the Mediterranean sea, a little to the S. of that of Corfu, about 15 miles in circumference. It is part of the republic of Seven Islands, and produces wine, oil, and almonds. San Nicolo is the only town, and has a good harbour. Lon. 20. 0 E. Lat. 39. 12 N.

To PAY. *v. a.* (*paier*, French.) 1. To discharge a debt (*Dryden*). 2. To dismiss one to whom any thing is due with his money: as, *he had* paid *his labourers*. 3. To atone; to make amends by suffering (*Roscommon*). 4. To beat (*Shakspeare*). 5. To reward; to recompense (*Dryden*). 6. To give the equivalent for any thing bought (*Locke*).

Pay. *s.* (from the verb.) Wages; hire; money given in return for service (*Temple*).

PA'YABLE. *a.* (*paiable*, French.) 1. Due; to be paid (*Bacon*). 2. Such as there is power to pay (*South*).

PA'YDAY. *s.* (*pay* and *day.*) Day on which debts are to be discharged, or wages paid.

PA'YER. *s.* (*paieur*, French.) One that pays.

PA'YMASTER. *s.* (*pay* and *master.*) One who is to pay; one from whom wages or reward is received (*Taylor*).

PA'YMENT. *s.* (from *pay.*) 1. The act of paying (*Bacon*). 2. The thing given in discharge of debt or promise (*Bacon*). 3. A reward (*South*). 4. Chastisement; sound beating (*Ainsworth*).

PAYS (René le), a French poet, comptroller of the imposts of Dauphiné and Provence, was the favourite of the ladies, by his miscellanies, called amitiés, amours, & amourettes, published 1685. He died 1690. He wrote besides Zelotide, a romance, colloquies, sonnets, &c.

Pays de Vaud, a new canton of Swisserland, extending along the lake of Geneva, and rising gradually from the edge of that lake. It is richly laid out in vineyards, corn-fields, and meadows, and chequered with many villages and towns. Lausanne is the capital.

To PAYSE. *v. n.* (used by *Spenser* for *poize.*) To balance.

PA'YSER. *s.* (for *poizer.*) One that weighs (*Carew*).

PAZ, a city of Peru, capital of a province of its name, in the audience of Charcos, and an archbishop's see. Beside the cathedral, it contains four churches, an hospital, a college, and several convents. It is seated at the foot of a mountain, in a valley abounding in wine and fruits, 220 miles N.W. of Plata. Lon. 68. 50 W. Lat. 17. 0 S.

PAZZI (James), a banker of Florence. He headed the faction which opposed the Medicis, and conspired to cut off the two brothers, Julian and Laurent, and to seize upon the sovereign power. The elevation of the host, 1478, was the signal for this murderous action, and at the moment of this solemn ceremony, Julian was stabbed to the heart by a brother of Pazzi; but Laurent escaped with a slight wound. The popularity of the Medicis, and the atrocity of the deed, armed the people in their favour, and the conspirators were seized, and punished with death. The house of the Pazzis was afterwards allied to the Medicis by marriage.

PEA, in botany. See Pisum.

Pea (Crown). See Pisum.

Pea (Everlasting). See Lathyrus.

Pea (Heart). See Cardiospermum.

Pea (Heath). See Orobus.

Pea (Painted Lady). See Lathyrus.

Pea (Pigeon). See Cytisus.

Pea (Scarlet). See Lathyrus.

Pea (Sweet). See Lathyrus.

Pea (Tangier). See Lathyrus.

Pea (Winged). See Lotus.

Pea (Wood). See Orobus.

PEACE. *s.* (*paix*, French; *pax*, Latin.) 1. Respite from war (*Addison*). 2. Quiet from suits or disturbances (*Davies*). 3. Rest from any commotion. 4. Stillness from riots or tumults (*Shakspeare*). 5. Reconciliation of differences (*Isaiah*). 6. A state not hostile (*Ba.*). 7. Rest; quiet; content; freedom from terrour; heavenly rest (*Tillotson*). 8. Silence; suppression of the thoughts (*Dryden*).

Peace, in law, signifies a quiet and harmless behaviour towards the king and his people. The king, by his office and dignity royal, is the principal conservator of the peace within all his dominions, and may give authority to any other to see the peace kept, and to punish such as break it: hence it is usually called the king's peace. All the great officers of state are generally conservators of the peace throughout the kingdom, and may commit all breakers of it, or bind them in recognizance to keep it. Also the sheriff, coroner, constables, and tithingmen are conservators of the peace within their own jurisdiction; and may apprehend all breakers of the peace, and commit them till they find sureties to keep the peace. 1 Black. 350.

Peace (Justices of the), are persons appointed by the king's commission to attend to the peace of the county where they dwell. They were called guardians of the peace till the 36th year of Edw. III. c. 12, where they are called justices.

A justice of the peace must, before he acts, take the oath of office, which is always done at the general quarter sessions for the county, by virtue of a dedimus potestatem out of chancery.

Sheriffs, coroners, attorneys, and proctors, may not act as justices of the peace.

The power, office, and duty of this magistrate extends to an almost infinite number of instances, specified in some hundreds of acts of parliament, and every year accumulating.

The commission of the peace does not determine by the demise of the king, nor until six months after, unless sooner determined by the successor: but before his demise, the king may determine it, or may put out any particular person; which is most commonly done by a new commission, leaving out such person's name.

Justices of the peace can only be appointed by the king's special commission, and such commission must be in his name; but it is not requisite that there should be a special suit or application to, or warrant from, the king for the granting thereof, which is only requisite for such as are of a particular nature; as constituting the mayor of such a town, and his successors, perpetual justices of the peace within their liberties, &c. which commissions are neither revocable by the king, nor determinable by his demise, as the common commission of the peace is, which is made of course by the lord chancellor, according to his discretion. 1 Lev. 219.

The form of the commission of the peace, as it is at this day, was, according to Hawkins, settled by the judges about the 23 Eliz. 4 Inst. 471.

Qualifications.—On renewing the commission of the peace (which generally happens when any person is newly brought into the same), a writ of dedimus potestatem is issued out of chancery to take the oath of him who is newly inserted, which is usually in a schedule annexed; and to certify the same into that court at such a day as the writ commands. Unto which oath are usually annexed the oaths of allegiance and supremacy. Lamb. 53.

Jurisdiction.—It seems now to be settled, that justices of the peace have no power to hear and determine felonies, unless they are authorized so to do by the express words of their commissions; and that their jurisdictions to hear and determine murder, manslaughter, and other felonies and trespasses, is by force of the word assignavimus in their commission, which gives them, or two of them (whereof one is of the quorum), power to hear and determine felonies, &c. 2 Haw. P. C. 38. And hence it has been lately adjudged, that the caption of an indictment of trespass before justices of the peace, without adding necnon ad diversas felonias, &c. assignant, is naught. Trin. 7 G. I. in B. R. But though justices of the peace, by force of their commission, have authority to hear and determine murder and manslaughter, yet they seldom exercise a jurisdiction herein, or in any other offences in which clergy is taken away, for two reasons: 1. By reason of the monition and clause in their commission, viz. in cases of difficulty to expect the presence of the justices of assize. 2. By the direction of the statute of 1 and 2 P. and M. c. 13, which directs justices of the peace in case of manslaughter and other felonies, to take the examination of the prisoner, and the information of the fact, and put the same in writing; and then to bail the prisoner if there is cause, and to certify the same with the bail at the next general gaol-delivery; and therefore in cases of great moment they bind over the prosecutors, and bail the party, if bailable, to the next general gaol-delivery; but in smaller matters, as petty larceny, and in some other cases, they bind over to the sessions; but this is only in point of discretion and convenience, not because they have not jurisdiction of the crime.

As to inferior offences, the jurisdiction herein given to justices of the peace by particular statutes is so various, and extends to such a multiplicity of cases, that it would be endless to endeavour to enumerate them. 6 Mod. 128. It has been held, that not only assaults and batteries, but libels, barratry, and common night-walking, and haunting bawdy-houses, and such like offences, which have a direct tendency to cause breaches of the peace, are cognizable by justices of the peace, as trespasses within the proper and natural meaning of the word. 1 Lev. 139.

Duty.—Justices of the peace are to hold their sessions four times in the year, viz. the first week after Michaelmas, the Epiphany, Easter, and St. Thomas. They are justices of record; for none but justices of record can take a recognizance of the peace. Every justice of the peace has a separate power, and may do all acts concerning his office apart and by himself, and even may commit a fellow-justice upon treason, felony, or breach of the peace; and this is the ancient power which conservators of the peace had at common law. By several statutes justices may act, in many cases, where their commission does not reach; the statutes themselves being a sufficient commission. Wood, Inst. 79, 80.

Justices of the peace are authorised to do all things appertaining to their office, so far as they relate to the laws for the relief, maintenance, and settlement of the poor; for passing and punishing vagrants; for repair of the highways; or to any other laws concerning parochial taxes, levies, or rates; notwithstanding they are rated or chargeable with the rates, with any place affected by such their acts. Provided that this shall not empower any justice for any county at large to act in the determination of any appeal to the quarter-sessions of such county, from any order, matter, or thing, relating to any such parish, township, or place where such justice is so charged or chargeable. 16 Geo. II. c. 18.

Peace. *interjection.* A word commanding silence (*Crashaw*).

Peace-offering. *s.* (*peace* and *offer.*) Among the Jews, a sacrifice or gift offered to God for atonement and reconciliation for a crime or offence (*Leviticus*).

PEA'CEABLE. *a.* (from *peace.*) 1. Free from war; free from tumult (*Swift*). 2. Quiet;

undisturbed (*Spenser*). 3. Not violent; not bloody (*Hale*). 4. Not quarrelsome; not turbulent (*Shakspeare*).

PEA'CEABLENESS. *s.* (from *peaceable.*) Quietness; disposition to peace (*Hammond*).

PEA'CEABLY. *ad.* (from *peaceable.*) 1. Without war; without tumult (*Swift*). 2. Without tumults or commotion (*Swift*). 3. Without disturbance (*Shakspeare*).

PEA'CEFUL. *a.* (*peace* and *full.*) 1. Quiet; not in war (*Dryden*). 2. Pacific; mild (*Dryden*). 3. Undisturbed; still; secure (*Pope*).

PEA'CEFULLY. *ad.* (from *peaceful.*) 1. Without war. 2. Quietly; without disturbance (*Dryden*). 3. Mildly; gently.

PEA'CEFULNESS. *s.* (from *peaceful.*) Quiet; freedom from war or disturbance.

PEA'CEMAKER. *s.* (*peace* and *maker.*) One who reconciles differences (*Shakspeare*).

PEACEPA'RTED. *a.* (*peace* and *parted.*) Dismissed from the world in peace (*Shakspeare*).

PEACH-TREE, in botany. See AMYGDALUS.

PEACH (Wolf's). See SOLANUM.

PEACH, in mineralogy, chlorite, a species of talc. See TALCUM.

To PEACH. *v. n.* (corrupted from *impeach.*) To accuse of some crime (*Dryden*).

PEACH-COLOURED. *a.* (*peach* and *colour.*) Of a colour like a peach (*Shakspeare*).

PEA'CHICK. *s.* (*pea* and *chick.*) The chick of a peacock (*Southern*).

PEACOCK, in ornithology. See PAVO.

PEAHEN, the female of the bird pavo.

PEAK. *s.* (peac, Saxon.) 1. The top of a hill or eminence (*Prior*). 2. Any thing acuminated. 3. The rising forepart of a headdress.

To PEAK. *v. n.* 1. To look sickly (*Shaks.*). 2. To make a mean figure; to sneak (*Shakspeare*).

PEAK, a mountainous district in the N.W. part of Derbyshire, which abounds in lead, iron, millstones, marble, alabaster, coal, and a coarse sort of crystals. It is much visited on account of its extraordinary caverns, perforations, and other curiosities. The Wonders of the Peak have been celebrated both in prose and verse; and they are noticed in this work under the articles BUXTON, CASTLETON, CHATSWORTH, and TIDESWELL.

PEAK OF TENERIFFE. See TENERIFFE.

PEAL. *s.* A succession of loud sounds: as of bells, thunder, cannon (*Hayward*).

To PEAL. *v. n.* (from the noun.) To play solemnly and loud (*Milton*).

To PEAL. *v. a.* To assail with noise (*Milton*).

PEAR (Avocado). See LAURUS.

PEAR (Prickly). See CACTUS.

PEAR (Garlic). See CRATÆVA.

PEARCE (Zachary), son of a distiller in Holborn, was educated at Westminster school and Trinity college, Cambridge. Distinguished at the university, and by some entertaining papers in the Guardian and the Spectator, he was patronized by Parker, earl of Macclesfield, to whom he dedicated his edition of Longinus, and from whom he obtained preferment. In 1739 he was made dean of Winchester, in 1748 bishop of Bangor, and in 1756 bishop of Rochester, and dean of Westminster. These last honours were unsolicited, and the bishop, who longed for the privacy of retired life, was anxious to resign; but he was permitted to divest himself only of the deanery of Westminster, in favour of Dr. Thomas. He died 1774. Dr. Pearce was eminent for his classical knowledge. He wrote a vindication of the miracles against Woolston, besides an account of Trinity college, Cambridge—letters against Conyers Middleton, &c.—a review of Milton's text—an essay on the origin of temples—sermons, &c. After his death appeared his commentary on the four evangelists, and the acts, 2 vols. 4to.—and 4 vols. of sermons, 8vo.

PEARCH. See PERCA and PERCH.

PEARL, in natural history, a hard concretion, of a brilliant silvery, or blueish white colour, found in some species of the oyster and muscle. See MARGARITA, OSTREA, and MYTILUS.

Pearls, though esteemed of the number of gems by our jewellers, and highly valued, not only at this time but in all ages, are supposed to proceed from a distemper in the creature that produces them, analogous to the bezoars and other stony concretions in several animals of other kinds.

The fish in which these are usually produced is the East Indian pearl-oyster, as it is commonly called. Besides this shell, there are many others that are found to produce pearls; as the common oyster, the muscle, and several others; the pearls of which are often very good; but those of the true Indian berberi, or pearl-oyster, are in general superior to all. The small or seed-pearls, also called ounce-pearls, from their being sold by the ounce and not by tale, are vastly the most numerous and common: but, as in diamonds, among the multitudes of small ones, there are smaller numbers and larger found, so in pearls there are larger and larger kinds; but as they increase in size, they are proportionably less frequent; and this is one reason of their great price. We have Scotch pearls frequently as big as a little tare, some as big as a large pea, and some few of the size of a horse bean; but these are usually of a bad shape, and of little value in proportion to their weight. Philip II. of Spain had a pearl perfect in its shape and colour, and of the size of a pigeon's egg. The finest, and what is called the true shape of the pearl, is a perfect round; but if pearls of a considerable size are of the shape of a pear, as is not unfrequently the case, they are not less valued, as they serve for ear-rings and other ornaments. Their colour ought to be a pure white; and that not a dead and lifeless, but a clear and brilliant one: they must be perfectly free from any foulness, spot, or stain; and their surfaces must be naturally smooth and glossy; for they bring their

natural polish with them, which art is not able to improve.

All pearls are formed of the matter of the shell, and consist of a number of coats spread with perfect regularity one over another, in the manner of the several coats of an onion, or like the several strata of the stones found in the bladders or stomachs of animals, only much thinner.

PEARL (Mother of), is the shell, not of the pearl oyster, but of another sea fish of the oyster kind. This shell is extremely smooth on the inside, and of the whiteness and water of pearl itself: it has a like lustre on the outside, after the first laminæ or scales have been cleared off with aquafortis and the lapidaries mill. Mother of pearl is used in inlaid works, and in several toys, as snuff-boxes, &c.

PEARL, in heraldry, in blazoning with precious stones, is the same with argent, or white.

PEARL ASH, an alkali used in various manufacturing processes: it is potash mixed with different heterogeneous substances. See POTASH.

PEARL BARLEY. See HORDEUM.

PEARL SPAR, in mineralogy, a name given to a species of iron ore, and of spar: see the articles FERRUM and SPATHUM.

PEARL FISHERY. The most important fishery to England at present is that at Ceylon. The origin of this method of procuring a valuable ornament for the person must have arisen from accidently discovering the pearl within oysters taken for food is evident; but it is impossible to ascertain when the search become systematical, though it is extremely probable it has been so for very many ages.

The pearl oysters of the coast of Ceylon are all of one species, and possess the same regularity of form; but they assume different qualities, and have different denominations, suited to the nature of the ground where they are situated, and from the appearance of zoophytes adhering to the external surface of their shells. See MYTILUS MARGARITIFERUS.

They resemble a cockle in shape, which is an imperfect oval, and their circumference is generally about nine inches and a half, having a segment as it were cut off where the joint of the two shells occurs. The interior of those is far more brilliant and beautiful than the pearl they enclose, and the outside is smooth, except when injured by the usurpations of sponges, corals, and other marine productions. The flesh of the animal is white, and of a glutinous consistency.

Perhaps no class of animated nature undergoes more unmerited persecution and destruction than the pearl-oyster; when situated in their native regions, they afford a foundation for the habitations of other animals, and millions of them are dragged from their banks, and thrown away, for what they are vainly supposed to contain, and that an intruder or a disease. One of the banks at Ceylon furnishes oysters to which zoophytes are attached, apparently belonging to the class of sponges, and those generally resemble a funnel or cup, and grows to a size that completely overshadows the oyster; others of different banks have a substance adhering to them tinged with red. The above are found to contain the finest pearls: some escape free from incumbrance, and thousands are compelled to bear trees of coral on them of five times their own weight.

The oyster is fastened to the rocks at the bottom of the sea by quantities of hairy fibres. By this means they are not readily swept from their original station, and yet possess the advantage of being conveyed to some distance from it by the motion of the water; besides they are connected to each other in the same manner. It frequently happens that an old oyster, surrounded by young ones, is brought up by the divers, and the latter have been ascertained to possess, even when little larger than a grain of sand, the power of moving themselves by the extension and contraction of what is termed the beard. The violence of the waves at the time of the monsoons occasions great changes in the state of the banks, when incredible numbers of them are buried by the shifting of sand, and that is sometimes removed by the same power acting in a contrary direction.

It is supposed, from many concurring circumstances, that the pearl-oyster arrives at maturity at the close of seven years; after this period it is imagined that it dies, when the body decaying is washed away by the sea: a bed was discovered a few years since composed almost wholly of empty shells. The precious substance, which invites the exertions of man to obtain it, has been generally supposed to be a disease peculiar to the animal; but were this the fact, it is extremely prevalent amongst this description of oysters, as every individual of the species is found to be accompanied by a certain proportion of minute particles, which are evidently the pearl in the first stages of formation; hence it may be fairly supposed, that they are in some essential degree useful, rather than prejudicial to the inhabitant of the shells, of the nature of which it decidedly partakes, and is composed of a number of layers, moveable by a skilful person to the improvement of the pearl, as it sometimes happens the exterior coat only may be discoloured or injured. When the pearl is in a state of perfection they are of a brilliant white, some have been found of a beautiful tint of pink, of the colour of gold, and a few entirely black. These variations are, however, very uncommon.

The pearls are discovered near the angles of the shell, and close to the hinge, where the animal is most thick and fleshy; they are generally numerous, and in some instances 150 have been taken from one oyster; on the other hand, an hundred oysters have been opened whence a pearl could not be extracted fit for any purpose whatever.

Attempts were made some years past to transplant this species of oysters, but without success, as they invariably died during their transportation.

The first step previously to a fishery is the

examination of the banks, which takes place at the end of October, during the short interval of fine weather usual between the close of the south-west monsoon and the commencement of the north-east. One pilot, two divers, and eight or more sailors, to each boat, are employed upon this service, and there are generally nine boats. The superintendant on the part of government accompanies the principal arripanaar, or pilot, who is taught his profession from his infancy, inheriting it from his father, in the manner of most occupations in the East. The boats visit the banks in a body, and the divers frequently descending, ascertain its exact position, and at the same time bring up a thousand or more oysters as specimens, which are examined by persons who, from experience, are enabled to judge whether it is probable they are of an age calculated to answer the purposes of the intended fishing: this examination is not, however, deemed sufficient, and the oysters are opened, when the pearls are extracted, and after sorting them they are valued. It is really shocking to humanity to reflect, that if one thousand oysters produce as many pearls as are worth three pounds sterling, the fishery is undertaken, as it has been found that the examination of that number is a sufficient designation of success, or the reverse.

In the progress of this preliminary part of the undertaking, the oysters are found at various periods of their growth: those not more than one year old are very small, being less than an inch in circumference, and the full grown oysters are as large as the palm of the hand of a man: between the ages of four and five years the seed pearl only is discovered; but after this period they increase in size very rapidly; and, as has been before observed, they die after the eighth year. After completely satisfying themselves as to the probability of future success, the result is published, for the information of those who may be inclined to partake of the probable advantages. Since the island of Ceylon has been a part of the British empire, each fishing season has either been reserved for the exclusive use of government, or rented to speculative persons: but the produce has never amounted to 200,000l. on any one occasion. The most common practice is to farm the season to an individual, who lets the right of partaking to others.

The fourteen banks, or beds, on which the oysters are found, are situated in the bottom of the gulph of Manaar, and are included in a space about thirty miles in length, from north to south, and twenty-four in breadth. It has been ascertained, that the largest of those beds is ten miles long, and two broad; the remainder are much smaller; nor are they all equally productive, as it seldom happens that more than three beds can be marked for use in any given season. The spots where the oysters lay are not raised higher than the surrounding parts, except by their accumulation, and the coral rocks, on which the most valuable are placed, are on a level with the sand: the depth of water over them varies from eighteen to ninety feet, and the most convenient and best fishing is at the depth of between six and eight fathoms. When it is thought proper to undertake a fishery, advertisements are issued in the English and Malabar languages, inviting the possessors of boats suited for the purpose, and all divers, to meet on the 20th of February in the bay of Condaatchy: vessels of this description assemble from various places on the coast of Coromandel, completely equipped, and furnished with every necessary for the accomplishment of their intentions: those are open, of about one ton burthen, forty-five feet in length, seven or eight wide, and three deep in the hold; and are so constructed as to draw not more than eight or ten inches water, unless they are heavily laden, and are navigated with one sail only. They have a complement of twenty-three men, whose employments are thus appropriated: one pilot, one man for the helm; another to take care of the boat; one to lade out water; ten divers; ten mundrees, who haul up the divers, the stones, and the baskets: and a peon attends on the part of the renter, to take care that his interests do not suffer from fraud.

A second examination of the banks takes place a few days before the operations begin, which is merely for the purpose of anchoring buoys to point out the situation of the banks, and those parts of them most abounding with the object of search. A small sloop is from the first stationed in the centre of the banks, where she remains for the double purpose of guarding the buoys, and as a guide to the boats. The pilot boats make a circuit of twelve or fifteen miles round the sloop, sounding and sending down the divers, and upon discovering a place remarkable for the number of oysters, a buoy is immediately placed over it, which consists of triangular rafts of wood, fastened by a cable attached to a wooden anchor, sunk by two stones. The rafts support flags of various colours; and drawings of those are inserted in a book, where a minute description is given of the name, quality, and age, of the oysters on the bank under each flag. Three hours sailing of the boats employed in the pearl fishery from the shore of Condaatchy, or a distance of about fifteen miles, occurs between the banks and that place: unfortunately the land near them is so low, that it is impossible to make use of it in ascertaining their position; it becomes, therefore, absolutely necessary to renew at each fishery the fatiguing operation of sounding and diving, the buoys being all removed at the close of their labours, as they would serve to point out the places for depredators to dive with success.

Mr. Cordiner, from whose late interesting account of Ceylon we have extracted most of the preceding particulars, says, "As the boats arrive at Condaatchy to be employed in the fishery, they are regularly numbered, and their description and the names of their crew are registered in a book. The fishery for the season of 1804 was let by government to a native

of Jaffnapatam, who had resided for some years previously to it on the coast of Coromandel. For thirty days fishing, with 150 boats, he came under an obligation to pay 300,000 Porto Novo pagodas, or 120,000l. sterling. He sold the right of fishing to some of the best equipped boats for 3000 pagodas each, and that of others for 2500; but kept by far the greater part of them to fish on his own account."

After every arrangement is completed, and the boats are ready to put to sea, their navigators and the divers are roused from their slumbers by the discharge of a cannon, the sounding of horns, and the beating of a kind of drum, called by the natives tom toms: this signal is generally made rather before midnight, when a breeze from the land prevails; the confusion that immediately follows the movements of upwards of six thousand persons in the dark may be better conceived than described; but in defiance of every obstacle, these silly people will not depart till they have performed certain ablutions and incantations, calculated, as they suppose, to forward their views. When they have reached the banks they cast anchor, and wait the approach of day; which no sooner arrives than each boat takes its station: at six or seven o'clock the diving commences. To facilitate this operation, a species of open scaffolding is projected from each side of the vessel, and it is from the scaffold the tackle is suspended, three stones on one side and two on the other. The author we have just mentioned gives so clear and comprehensive an account of this dangerous business, which he saw performed, that we shall give part of it in his own words. "The diving stone hangs from an oar by a light country rope, and slip knot, and descends about five feet into the water. It is a stone of 56lb. weight, of the shape of a sugar loaf. The rope passes through a hole in the top of a stone, above which a strong loop is formed, resembling a stirrup-iron, to receive the foot of the diver," who is entirely naked, except a piece of cahio wrapped round his waist; swimming near the side of the vessel, he takes the rope in one hand, and places his foot in the stirrup on the stone; a basket is then thrown into the water to him, made of a hoop and net work below it, in which he places the other foot: after preparing his lungs for ceasing to breathe, he presses his nostrils firmly with one hand, and with the other pulls the rope forming the slip-knot; the stone carries him instantly to the bottom, where he no sooner arrives, than he disengages himself from the stirrup, which, with the stone, is immediately drawn up by the people in the boat. The diver throws himself forward upon his face, and grasps every thing in his way as rapidly as possible, and putting it into the basket, gives a signal when it is full by pulling the rope, when that also is hauled up; he then ascends by the rope, and frequently arrives at the surface before the basket: such is the consequence of custom, that though the diver cannot descend again without an interval of rest, he seldom enters the boat, remaining swimming and floating about during the whole day.

Besides the other dangers peculiar to this pursuit, the divers are liable to be devoured by sharks: but whatever may be the cause, an accident seldom occurs, which these superstitious people attribute to the powerful aid of shark charmers, without whom, and the exercise of their diabolical incantations, they will on no account undertake their labours. The most experienced diver has never been known to remain longer than one minute and a half under water, in which time he may gather 150 oysters, if they are numerous; but he sometimes gains not more than from five to a dozen, accompanied by coral pieces of rock and other substances, for he has no time to separate and examine what he seizes. When 300 boats are employed in the fishery, it is supposed that at least 1500 divers are constantly descending, the noise of which resembles the incessant roaring of a cataract. The return of the fleet in regular order, at one or two P. M. and their arrival, with the crowds waiting to welcome their return, presents a very animating and gratifying spectacle.

The method adopted to extract the pearls is dreadfully disgusting and unwholesome, as they do not undertake this operation till the oysters have been deposited in heaps for ten days, or till the flesh has become decidedly putrid: the reason for so doing is obvious, as the particles of decayed matter and maggots are readily floated off by repeated washings in inclined receptacles, so contrived as to arrest the progress of even the smallest pearls, as they descend by their weight. Every possible precaution is taken, by picking and sifting, to secure the whole of the produce, and yet it is said that vast numbers are lost.

After the most valuable are selected, they are sent to be drilled; a most ingenious and delicate operation, which is thus performed: a piece of wood in the shape of an inverted cone is placed upon three legs, raising it about one foot from the ground: holes of various dimensions are made in the surface to receive the pearls: the person who drills sits close to the machine; he then drives the pearls steady into their sockets. "A well-tempered needle is fixed in a reed five inches long, with an iron point at the other end, formed to play in the socket of a cocoa nut shell, which presses on the forehead of the driller. A bow is formed of a piece of bamboo and a string. The workman brings his right knee in a line with the machine, and places on it a small cup, formed of part of a cocoa nut shell, which is filled with water to moderate the heat of friction. He bends his head over the machine, and applying the point of the needle to a pearl sunk in one of the pits, drills with great facility, every now and then dexterously dipping the little finger of his right hand in the water, and applying it to the middle, without impeding the operation. In this manner he bores a

pearl in the space of two or three minutes, and in the course of a day perforates 300 small, or 600 large pearls."

There are different methods of fishing for pearls practised in other parts of the world; but as the Ceylon fishery eclipses them all, and the simplicity of the invention is so obvious, it would be well if it were universally adopted.

PEARLSTEIN, or PEARLSTONE, in mineralogy, occurs in round and longish vesicles. Its lustre is shining and pearly, and its colour varies from the pearl to the flesh red and greyish black. It is composed of thin, concentric, lamellar concretions. It is translucent on the edges, easily frangible, and soft. It occurs in porphyry, and contains balls of obsidian, and is found in Hungary. It is composed of

Silex	75.25
Alumina	12.
Oxid of iron	1.6
Potash	4.5
Lime	2.5
Water	2.5
	98.35
Loss	1.65
	100

PEARLS (Artificial). Attempts have been made to take out stains from pearls, and to render the foul opaque-coloured ones equal in lustre to the oriental. Abundance of processes are given for this purpose in books of secrets and travels; but they are very far from answering what is expected from them. Pearls may be cleaned indeed from any external foulnesses by washing and rubbing them with a little Venice soap and warm water, or with ground rice and salt, with starch and powder-blue, plaster of Paris, coral, white vitriol and tartar, cuttle-bone, pumice-stone, and other similar substances; but a stain that reaches deep into the substance of pearls is impossible to be taken out. Nor can a number of small pearls be united into a mass similar to an entire natural one, as some pretend.

There are, however, methods of making artificial pearls in such manner as to be with difficulty distinguished from the best oriental. The ingredient used for this purpose was long kept a secret; but it is now discovered to be a fine silver-like substance found upon the under side of the scales of the blay or bleak fish. The scales, taken off in the usual manner, are washed and rubbed with fresh parcels of fair water, and the several liquors suffered to settle: the water being then poured off, the pearly matter remains at the bottom, of the consistence of oil, called by the French essence d'orient. A little of this is dropped into a hollow bead of bluish glass, and shaken about so as to line the internal surface; after which the cavity is filled up with wax, to give solidity and weight. Pearls made in this mannear are distinguishable from the natural only by their having fewer blemishes.

PEA'RLED. *a.* (from *pearl.*) Adorned or set with pearls (*Milton*).

PEA'RLEYED. *a.* (*pearl* and *eye.*) Having a speck in the eye.

PEARLWORT. See SAGINA.

PEA'RLY. *a.* (from *pearl.*) 1. Abounding with pearls; containing pearls (*Woodward*). 2. Resembling pearls (*Drayton*).

PEA'RMAIN. *s.* An apple (*Mortimer*).

PEARSON (John), a very learned English bishop in the 17th century, was born at Snoring in 1613. After his education at Eton and Cambridge, he entered into holy orders in 1639, and was the same year collated to the prebend of Netherhaven in the church of Sarum. In 1640 he was appointed chaplain to the lord keeper Finch, and by him presented to the living of Torrington in Suffolk. In 1650 he was made minister of St. Clement's, East-cheap, in London. In 1657, he and Mr. Gunning had a dispute with two Roman Catholics upon the subject of schism; a very unfair account of which was printed at Paris in 1658. Some time after, he published at London an Exposition of the Creed, in folio, dedicated to his parishioners of St. Clement's, East-cheap, to whom the substance of that excellent work had been preached several years before, and by whom he had been desired to make it public. The same year he likewise published The Golden Remains of the ever memorable Mr. John Hales of Eton; to which he prefixed a preface, containing, of that great man, with whom he had been acquainted for many years, a character drawn with great elegance and force. Soon after the Restoration, he was presented by Juxon, then bishop of London, to the rectory of St. Christopher's in that city; created doctor of divinity at Cambridge, in pursuance of the king's letters mandatory; installed prebendary of Ely; archdeacon of Surry; and made master of Jesus college in Cambridge: all before the end of the year 1660. March 25th, 1661, he was appointed Margaret professor of divinity in that university; and, the first day of the ensuing year, was nominated one of the commissioners for the review of the liturgy in the conference at the Savoy. April 14th, 1662, he was admitted master of Trinity college in Cambridge; and, in August, resigned his rectory of St. Christopher's and prebend of Sarum. In 1667 he was admitted a fellow of the Royal Society. In 1672 he published at Cambridge, in 4to, Vindiciæ Epistolarum S. Ignatii, in answer to Mons. Daillé; to which is subjoined, Isaaci Vossii epistolæ duæ adversus Davidem Blondellum. Upon the death of the celebrated Wilkins, Pearson was appointed his successor in the see of Chester, to which he was consecrated February 9th, 1672-3. In 1682, his Annales Cyprianici, sive tredecim annorum, quibus S. Cyprian, inter Christianos versatus est, historia chronologica, was published at Oxford, with Fell's edition of that father's works. Pearson was disabled from all

public service by ill health a considerable time before his death, which happened at Chester, July 16th, 1686.

PEAR-TREE, the tree that bears pears. See PYRUS.

PEASANT, a hind; one whose business is rural labour. It is amongst this order of men that a philosopher would look for innocent and ingenuous manners. The situation of the peasantry is such as secludes them from the devastations of luxury and licentiousness; for, when the contagion has once reached the recesses of rural retirement, and corrupted the minds of habitual innocence, that nation has reached the summit of vice, and is hastening to that decay which has always been the effect of vicious indulgence. The peasantry of this country till lately retained that simplicity of manners and rustic innocence which ought to be the characteristic of this order of society; and, in many parts, their condition is still such as, were all its advantages sufficiently known, would create envy in the minds of those who have toiled through life, amidst the bustle of the world, in quest of that happiness which it could not confer.

O fortunatos nimium, sua si bona nôrint,
Agricolas.—— VIRGIL.

In other countries the peasants do not enjoy the same liberty as they do in our own, and are consequently not so happy. In all feudal governments they are abject slaves, entirely at the disposal of some petty despot. Much of the happiness and of the real prosperity of a country depend upon the state of the peasantry.

"Ill fares the land, to hastening ills a prey,
Where wealth accumulates, and men decay:
Princes and lords may flourish, or may fade;
A breath can make them as a breath has made;
But a bold peasantry, their country's pride,
When once destroy'd, can never be supplied."
GOLDSMITH.

PEA'SANTRY. *s.* Peasants; rustics; country people (*Locke*).

PEA'SCOD. PEA'SHELL. *s.* (*pea, cod* and *shell.*) The husk that contains peas (*Gay*).

PEASE. *s.* Food of peas (*Arbuthnot*).

PEAT, in mineralogy, a combustible material often called turf, consisting of a congeries of vegetable matter, in which the remains of organization are more or less visible; comprising trunks of trees, chiefly oak, fir, birch, alder, hazle, and willow; of leaves and fruits, particularly hazle-nuts; and of long stringy fibres which appear for the most part the remains of the sphagnum palustre, and other aquatic mosses. It occurs, for the most part, in extensive beds called peat-mosses, either occupying the surface of the soil, or covered to the depth of a few feet with sand, gravel and other alluvial matters. It is met with abundantly in the northern and in some of the central districts of Europe, in all moist uncultivated mountainous tracts, as high as vegetation extends; it is also frequent in low vallies and fenny plains; and in several parts of the western shore of Great Britain runs into the sea, to an unknown extent, as in the harbour of Oban in Argyleshire; in Lancashire, a little town to the north of Liverpool; and near Towyn in Merionethshire.

The depth of peat-mosses is very various; from a few feet to twelve or fifteen yards or even more. The consistence of peat is equally various, being sometimes in a semifluid state, forming a black impassable wilderness, studded here and there by tufts of rushes. When more solid it is scantily covered over with heath and coarse grasses, and is then passable by sheep and other larger animals, especially during the dry season of the year. In all deep peat-mosses it is found that the upper part of the peat is looser, of a lighter colour, and less inflammable than that which forms the lower part of the bed. When of a good quality it is moderately compact, and may readily be cut into solid masses like bricks with a sharp thin spade. If it manifests any considerable degree of elasticity and resistance to the spade, its quality is always found to be very inferior. By exposure to the air it dries slowly, being very retentive of moisture, acquires a brownish black colour, becomes moderately hard, and in this state is very inflammable. By the further action of the weather it falls gradually to pieces, and is decomposed though very slowly. When kindled in an open grate the best kind burns with a yellowish-blue flame almost like charcoal, and a less quantity of smoke than wood affords: it gives out a great quantity of heat, and is reduced to light ashes of a white or reddish-yellow colour. Some varieties of peat are considerably charged with iron pyrites, on which account they effloresce and vitriolize when exposed to the air, and in burning give out a strong sulphureous odour, much smoke and little heat, and afford a heavy reddish-brown ash. Sulphats of soda and magnesia are also occasionally found in peat, and produce a similar bad effect on it, considered as a combustible.

By digestion in boiling water peat affords a deep brown solution, slightly bitter to the taste, and containing an uncombined vegetable acid considerably resembling the suberic, with a portion of extract, and a little sulphat.

By dry distillation there comes over a watry ammoniacal liquor, an empyreumatic oil, and carburetted hydrogen, a considerable quantity of charcoal remaining in the retort.

Many ingenious attempts have been made, especially in France and Germany, to substitute with economy the charcoal of peat for that of wood, for culinary and metallurgical purposes, and it seems to be satisfactorily proved that a given bulk of the former burns somewhat longer, and affords a more considerable heat than of the latter; but it appears to be incapable of withstanding the action of a forge bellows, and is apt to deteriorate the quality of iron that is smelted by it. Another objection however occurs to the employment of peat charcoal on the score of its being less economical, except in very particular circumstances, than wood charcoal. It cannot be prepared in

the manner of common charcoal, on account of its loose texture, without a prodigious loss of the substance and deterioration of quality: the manufacturer must therefore have recourse to distillation in iron cylinders, or other vessels; but to effect this so large a quantity of peat must be consumed as fuel, that the value of the charcoal, the oil and ammonia will hardly cover the expence. Hence it is that all the establishments in France for this purpose have of late been entirely abandoned. See the article TURFA.

PEAT. *s.* (from *petit*, Fr.) A little fondling; a darling: now commonly *pet* (*Donne*).

PEAUCIER, in anatomy, a name given by Winslow, in his Treatise on the Head, and by some of the French writers, to the muscle called by Albinus latissimus colli; and by others detrahens quadratus, and quadratus genæ. Santorini has called the part of this which arises from the cheek musculus risorius novus; and some call the whole platysma myoides.

PEBBLES, the name of a genus of fossils, distinguished from the flints and homocroa by their having a variety of colours. These are defined to be stones composed of a crystalline matter debased by earths of various kinds in the same species, and then subject to veins, clouds, and other variegations, usually formed by incrustation round a central nucleus, but sometimes the effect of a simple crystallization; and veined like the agates, by the disposition which the motion of the fluid they were formed in gave their differently coloured substances.

The variety of pebbles is so great, that an hasty describer would be apt to make almost as many species as he saw specimens. A careful examination will teach us, however, to distinguish them into a certain number of essentially different species, to which all the rest may be referred as accidental varieties. When we find the same colours, or those resulting from a mixture of the same, such as nature frequently makes in a number of stones, we shall easily be able to determine that these are all of them the same species, though of different appearances; and that whether the matter be disposed of in one or two, or in 20 crusts, laid regularly round a nucleus; or thrown irregularly, without a nucleus, into irregular lines; or, lastly, if blended into an uniform mass. See PYROMACHUS and PETROSILEX.

PE'BBLED. *a.* (from *pebble.*) Sprinkled or abounding with pebbles (*Thomson*).

PE'BBLY. *a.* (from *pebble*). Full of pebbles.

PECARI, in mastiology. See SUS.

PECCABI'LITY. *s.* (from *peccable.*) State of being subject to sin (*Decay of Piety*).

PE'CCABLE. *a.* (from *pecco*, Lat.) Liable to sin.

PECCADI'LLO. *s.* (Spanish; *peccadille*, Fr.) A petty fault; a slight crime; a venial offence (*Atterbury*).

PE'CCANCY. *s.* (from *peccant.*) Bad quality (*Wiseman*).

PE'CCANT. *a.* (*peccant*, Fr.) 1. Guilty; criminal (*South*). 2. Ill-disposed; corrupt; bad; offensive to the body; injurious to health (*Arbuthnot*). 3. Wrong; bad; deficient; unformal (*Ayliffe*).

PECHBLENDE, in mineralogy, a species of URANIUM, which see.

PECHLARN, a town of Austria, on the right bank of the Danube. The river is very wide; and here the Romans, who called it Præclara, had a harbour for their navy. It is 14 miles W. of St. Polten, and 48 E. of Lintz.

PECHURIM CORTEX. An highly aromatic bark, the produce of a species of laurus. It is extremely fragrant, like that of cinnamon, which it greatly resembles in its properties. In Lisbon it is much esteemed in the cure of dysenteries, and for allaying obstinate vomitings.

PECHURIM FABA. See FABA PECHURIM.

PECHURIS. See PECHURIM.

PECHYS, a name used by some anatomical writers for the elbow.

PECK (Francis), an antiquary, born 1692, at Stamford, Lincolnshire. He was educated at Cambridge, and obtained the living of Godeby, near Melton, Leicestershire, where he died 1743. He published 1727, in folio, The Antiquarian Annals of Stamford, &c.—Memoirs of Cromwell and of Milton, 2 vols. 4to. He published besides Desiderata Curiosa, 2 vols. containing curious pieces of English history, &c.

PECK. *s.* (from pocca, Saxon.) 1. The fourth part of a bushel (*Hudibras*). 2. Proverbially. (In low language.) A great deal (*Suckling*).

To PECK. *v. a.* (*becquer*, Fr. *picken*, Dut.) 1. To strike with the beak as a bird. 2. To pick up food with the beak (*Addison*). 3. To strike with any pointed instrument (*Carew*). 4. To strike; to give blows (*South*).

PE'CKER. *s.* (from *peck.*) 1. One that pecks. 2. A kind of bird: as the wood-*pecker* (*Dryden*).

PE'CKLED. *a.* (corrupted from *speckled.*) Spotted; varied with spots (*Walton*).

PECKWELL (Henry), a divine of the church of England, and rector of Bloxham, in Lincolnshire. He was born in 1747, and attached himself to the Calvinistic methodists, among whom he was very popular. Dr. Peckwell was the principal founder of a society for visiting the sick at their own homes; and, to make himself the more useful, he studied physic. In opening a young person who died of a putrid fever, he unfortunately wounded himself in the hand, which mortified, and ended in his death in 1787. He printed some sermons preached on particular occasions.

PECORA. In the general system of Linnéus, the fifth order in the class mammalia, thus ordinally characterized: without fore-teeth in the upper jaw, many in the lower; feet hoofed, cloven; food, herbs which they pluck; they chew the cud; have four stomachs, the paunch to macerate and ruminate the food, the bonnet, reticulate, to receive it, the omasus or maniplies of numerous folds to digest it, and

the abomasus or caille, fasciate, to give it ascescency and prevent putrefaction. See ZOOLOGY.

PECQUET (John), a celebrated physician, born at Dieppe. He immortalized his name by the discovery of the lacteal vein which conveys the chyle to the heart, and from him termed the reservoir of Pecquet. In 1654, he published, at Paris, a work entitled Experimenta nova Anatomica, and in 1661, at Amsterdam, De Thoracis Lacteis, which added greatly to his reputation. He died at Paris in 1674.

PECQUET (Antoine), a celebrated French scholar, born in 1704. His writings, which are numerous, shew at once the philosopher, the politician, and the moralist. His Spirit of the Laws, and of Political Maxims, and Thoughts on Man, are the most esteemed. He was made grand-master of the water-works and forests of Rouen, and died in 1762. (*Watkins*).

PECQUET'S DUCT. See THORACIC DUCT.

PECTEN. See OSTREA.

PECTINÆUS, in myology. See PECTINALIS.

PECTINALIS. (*pectinalis musculus*, so named from its arising at the *pecten*, or pubis.) Pectinæus of Albinus. In myology. This is a small flat muscle, situated obliquely between the pubis and the little trochanter, at the upper and anterior part of the thigh. It arises broad and fleshy from all the anterior edge of the os pectinis, or pubis, as it is more commonly called, as far as its spine, and descending obliquely backwards and outwards, is inserted by a short and broad tendon, into the upper and anterior part of the linea aspera of the os f[illegible] moris a little below the lesser trochanter. This muscle serves to bend the thigh, by drawing it upwards and inwards, and likewise assists in rolling it outwards.

PECTINATE LEAF. A sort of pinnate leaf, in which the leaflets are toothed like a comb: as in artemisia pectinata. The term is also used in the same sense in zoology.

PECTINATI MUSCULI. (*pectinatus*, from *pecten*, a comb; so named from their s[illegible]posed resemblance.). The fasciculated muscular fibres of the right auricle of the heart.

PECTINATION. *s.* The state of being pectinate.

PECTIS, in botany, a genus of the class syngenesia, order polygamia superflua. Receptacle naked; seeds crowned with three or four awns; calyx five-leaved; florets of the ray five. Five species, natives of the West Indies.

PECTORAL, a sacerdotal habit or vestment, worn by the Jewish high-priest. The Jews called it hhoschen, the Greeks λογιον, the Latins rationale and pectorale, and in our version of the Bible it is called breastplate. It consisted of embroidered stuff, about a span square, and was worn upon the breast, set with twelve precious stones, ranged in four rows, and containing the names of the twelve tribes. It was fastened to the shoulder by two chains and hooks of gold. God himself prescribed the form of it. See BREASTPLATE.

PECTORALIS. In anatomy. See PECTORALIS MAJOR.

PECTORALIS MAJOR. (*musculus pectoralis*; from *pectus*, the breast.) Pectoralis of Albinus. This is a broad, thick, fleshy, and radiated muscle, situated immediately under the integuments, and covering almost the whole anterior part of the breast. Winslow calls it pectoralis major, to distinguish it from the serratus anticus, which he has named pectoralis minor. It arises from the cartilaginous extremities of the fifth and sixth ribs, from the last of which its tendinous fibres descend over the upper part of the obliquus externus and rectus abdominis, helping to form a part of the sheath in which the latter is included. It likewise springs from almost the whole length of the sternum by short tendinous fibres, which evidently decussate those on the other side; and tendinous and fleshy from more than a third of the anterior part of the clavicle. From these origins the fibres run in a folding manner towards the axilla, and are inserted by a broad tendon into the os humeri, above the insertion of the deltoid muscle, and at the outer side of the groove which lodges the tendon of the long head of the biceps: some of its fibres likewise extend into that groove; and, from the lower part of this tendon, which is spread near two inches along the os humeri, we find it sending off other fibres, which help to form the fascia, that covers the muscles of the arm. It often happens, that that part of the pectoralis which arises from the clavicle is separated from the in[illegible] portion, so as to appear like a distinct m[illegible] This has induced Winslow to divide it into parts, one of which he calls the clavicular, and the other the thoracic portion. Sometimes these two portions are inserted by separate tendons, which cross one another at the upper and inner part of the os humeri, the tendon of the thoracic portion being inserted at the outer edge of the bicipital groove, immediately behind the other. This muscle, and the latissimus dorsi, form the cavity of the axilla or arm-pit. The use of the pectoralis is to move the arm forwards, or to raise it obliquely towards the sternum. It likewise occasionally assists in moving the trunk upon the arm; thus, when we exert any efforts with the hand, as in raising ourselves from off an arm-chair, or in sealing a letter, the contraction of this muscle is particularly observable. To these uses Haller adds that of assisting in respiration, by raising the sternum and ribs. He tells us he well remembers, that when this muscle was affected by rheumatism, his breathing was incommoded: and that, when troubled with difficulty of respiration, he has often found himself greatly relieved by raising and drawing back his shoulders, keeping his arms at the same time firmly fixed. Winslow, however, has denied this use, and Albinus has omitted it, probably because it does not take place in a natural state.

PECTORALIS MINOR. Serratus anticus of

Albinus. Douglas calls this muscle serratus minor anticus, and Winslow gives it the name of pectoralis minor. It is a fleshy and pretty considerable muscle, situated at the anterior and lateral part of the thorax, immediately under the pectoralis major. It arises from the upper edges of the third, fourth, and fifth ribs, near where they join with their cartilages by an equal number of tendinous and fleshy digitations, which have been compared to the teeth of a saw, whence this and some other muscles, from their having a similar origin or insertion, have gotten the name of serrati. From these origins it becomes thicker and narrower as it ascends, and is inserted by a flat tendon into the upper part of the coracoid process of the scapula. The principal use of this muscle is to draw the scapula forwards and downwards; and when that is fixed, it may likewise serve to elevate the ribs.

PECTORALS. (*medicamenta pectoralia*, from *pectus*, the breast.) Medicines that relieve disorders of the chest.

PECTUS. The breast. See THORAX.

PE'CULATE. PECULA'TION. *s.* (*peculatus*, Lat. *peculat*, Fr.) Robbery of the public; theft of public money.

PECULA'TOR. *s.* (Latin.) Robber of the public.

PECU'LIAR. *a.* (*peculiaris*, Lat.) 1. Appropriate; belonging to any one with exclusion of others (*Swift*). 2. Not common to other things (*Locke*). 3 Particular; single (*Milton*).

PECU'LIAR. *s.* 1. The property; the exclusive property (*Milton*). 2. Something abscinded from the ordinary jurisdiction (*Carew*).

PECULIAR, in the canon law, signifies a particular parish or church that has jurisdiction within itself for granting probates of wills and administrations, exempt from the ordinary or bishop's court. The king's chapel is a royal peculiar, exempt from all spiritual jurisdiction, and reserved to the visitation and immediate government of the king himself. There is likewise the archbishop's peculiar: for it is an ancient privilege of the see of Canterbury, that wherever any manors or advowsons belong to it, they forthwith become exempt from the ordinary, and are reputed peculiars: there are 57 such peculiars in the see of Canterbury. Besides these, there are some peculiars belonging to deans, chapters, and prebendaries, which are only exempted from the jurisdiction of the archdeacon: these are derived from the bishop, who may visit them, and to whom there lies an appeal.

PECULIARS (Court of), is a branch of, and annexed to, the court of Arches. It has a jurisdiction over all those parishes dispersed through the province of Canterbury in the midst of other dioceses, which are exempt from the ordinary's jurisdiction, and subject to the metropolitan only. All ecclesiastical causes arising within these peculiar or exempt jurisdictions are originally cognizable by this court; from which an appeal lay formerly to the pope, but now, by the stat. 25 Henry VIII. c. 19. to the king in chancery.

PECULIA'RITY. *s.* (from *peculiar.*) Particularity; something found only in one (*Swift*).

PECU'LIARLY. *ad.* (from *peculiar.*) 1. Particularly; singly (*Woodward*). 2. In a manner not common to others (*Fell*).

PECU'NIARY. *a.* (*pecuniarius*, Lat.) 1. Relating to money (*Brown*). 2. Consisting of money (*Bacon*).

PED. *s.* (commonly pronounced *pad*). 1. A small packsaddle (*Tusser*). 2. A basket; a hamper (*Spenser*).

PEDAGO'GICAL. *a.* (from *pedagogue.*) Suiting or belonging to a schoolmaster.

PE'DAGOGUE. *s.* (παιδαγωγος.) One who teaches boys; a schoolmaster; a pedant (*Dryden*).

To PE'DAGOGUE. *v. a.* (παιδαγωγεω.) To teach with superciliousness (*Prior*).

PE'DAGOGY. *s.* (παιδαγωγια.) Preparatory discipline (*South*).

PE'DAL. *a.* (*pedalis*, Lat.) Belonging to a foot.

PEDALE. (Ital.) In music. An epithet applied to a fixed or stationary bass, during which the superior parts evolve through various independent harmonies.

PEDAL-NOTE. A holding note, during which the harmony formed by the other parts of the composition is allowed to proceed independently.

PEDALS, the largest pipes of an organ, so called because played and stopped with the foot. The pedals are made square, and of wood; they are usually 13 in number. They are of modern invention, and serve to carry the sounds an octave deeper than the rest. See ORGAN.

PEDALIUM, in botany, a genus of the class didynamia, order angiospermia. Calyx five-parted: corol somewhat ringent, with the border five-cleft; nut corky, four-sided, with spinous angles, two-celled; seeds two. One species; a native of India, with stem simple, and axillary, solitary flowers.

PEDA'NEOUS. *a.* (*pedaneus*, Lat.) Going on foot.

PE'DANT. *s.* (*pedant*, Fr.) 1. A schoolmaster (*Dryden*). 2. A man vain of low knowledge (*Swift*).

PEDA'NTICAL. PEDA'NTIC. *a.* (*pedantesque*, Fr. from *pedant.*) Awkwardly ostentatious of learning (*Hayward*).

PEDA'NTICALLY. *ad.* With awkward ostentation of literature (*Dryden*).

PE'DANTRY. *s.* (*pedanterie*, Fr.) Awkward ostentation of needless learning (*Cowley*).

PEDATE, in zoology, deeply cut into segments connected with the petiole on the inner side only, like a bird's foot.

PEDATE LEAF. (*pes*, a foot). In botany. Cum petiolus bifidus latere tantum interiore adnectit foliola plura. When a bifid petiole connects several leaflets on the inside only. This is a species of compound leaf, and bears some resemblance to a bird's foot. It is exemplified in passiflora, arum, and helleborus fœtidus. It is applied also to the raceme.

PEDATIFID LEAF. In botany. This is to pedate, what pinnatifid is to pinnate: the parts of the leaf not being separate; but connected, as in the feet of water fowl. Exemplified in arum muscivorum.

To PEDDLE. *v. n.* To be busy about trifles: commonly written *piddle* (*Ainsworth*).

PEDDLING. *a.* Petty-dealing; trifling; unimportant (*Decay of Piety*).

PEDEE, a river of the United States which rises in N. Carolina, and is there called Yadkin river; on entering S. Carolina, it takes the name of Pedee, and flows into Wynyaw bay, at Georgetown.

PEDERASTS, the same with Sodomites.

PEDERERO. *s.* (*pedrero*, Span.) A small cannon managed by a swivel. It is frequently written *paterero*.

PEDES HIPPOCAMPI. (*pes*, *pedes*). In anatomy, two columns at the end of the fornix of the brain, which diverge posteriorly. They are so named from their resemblance to the feet of the hippocampus, or sea-horse.

PEDESTAL. *s.* (*piedestal*, Fr.) The lower member of a pillar: the basis of a statue (*Add.*).

PEDESTRIOUS. *a.* (*pedestris*, Lat.) Not winged; going on foot (*Brown*).

PEDIEAN, in Grecian antiquity. The city of Athens was anciently divided into three different parts; one on the descent of an hill; another on the sea-shore; and a third in a plain between the other two. The inhabitants of the middle region were called Πεδιαιοι, Pedixans, formed from πεδιον, plain, or flat; or, as Aristotle will have it, Pediaci: those of the hill, Diacrians; and those of the shore, Paralians. These quarters usually composed so many different factions. Pisistratus made use of the Pedireans against the Diacrians. In the time of Solon, when a form of government was to be chosen, the Diacrians chose it democratic; the Pediæans demanded an aristocracy; and the Paralians a mixed government.

PEDICEL, or PEDICLE, in botany. In Philos. Botan. it is interpreted—*pedunculus partialis*, a partial peduncle. But in Delin. Pl. a partial peduncle is a subdivision of a common peduncle, supporting a few flowers. The genuine notion of a pedicel is, that it supports one flower only where there are several on a peduncle; or, it is the ultimate subdivision of a common peduncle, immediately connected with the flower itself.

PEDICELLARIA, in zoology, a genus of the class vermes, order molusca. Body soft and seated on a rigid fixed peduncle; aperture single. Three species; all inhabitants of the North Seas, and found in the midst of the spines of echini. P. globifera has a spherical head, but no neck; its body is minute and resembles a mucor; the colour of the head is reddish, and has the appearance of a small cherry; peduncle or stem tawny and covered with a gelatinous hyaline skin.

PEDICULAR. *a.* (*pedicularis*, Lat.) Having the phthyriasis or lousy distemper (*Ainsworth*).

PEDICULARIA. (*pedicularia*, from *pediculus*, a louse; so called from its use in destroying lice.) The herb staves acre. See STAPHISAGRIA.

PEDICULARIS. Louse-wort. In botany, a genus of the class didynamia, order angiospermia. Calyx mostly five-cleft, inflated; corol with the upper lip compressed and emarginate; capsule two-celled, mucronate, oblique; seeds few, angular, mucronate. Thirty-four species. Almost all European plants; two common to the marshes or pastures of our own country.

PEDICULUS. Louse. In zoology, a genus of the class insecta, order aptera. Mouth with a retractile, recurved sucker without proboscis; tentacleless; antennas as long as the thorax; eyes two; abdomen depressed; legs six, formed for running. Sixty-six species; about half of them common to our own country, and found on the bodies of man, quadrupeds, birds, and the larger insects. They live by extracting animal juices: the larves and pupes are six-footed and nimble, resembling the insect in its perfect state. It is highly probable, though not more than sixty-six species have yet been classified, that there is no tribe of quadrupeds or birds that is not infested by a pediculus of its own. Their specific names are derived from the animal they inhabit: hence we have P. humanus, P. suis, P. ovis, P. anseris, &c. Man appears to be infested by three distinct species:

1. P. humanus. Common louse, with lobed cinereous abdomen, found in the heads and on the garments of such as are naturally uncleanly, especially boys.

2. P. pubis. Crab-louse, with chaliform legs, and the abdomen emarginate behind: found on the groins and eye-brows of uncleanly men.

3. P. ricinoides: with reddish body, abdomen orbicular with a white line; scutel three-lobed; and white sucker armed with small hooks beneath. Inhabits America, and gets into the legs of the naked inhabitants, where it draws blood; and depositing its eggs in the wound, occasions foul and malignant ulcers.

Lewenhoek affirms, that the first of these is, in the male sex, furnished with a sting at the extremity of the abdomen, and that hence proceeds the irritation the animal inflicts. The male is easily distinguished from the female, the tail or tip of the abdomen being rounded in the former, and forked or bifid in the latter. He found that in six days a female will lay fifty eggs; and upon dissecting it after that period, he discovered as many more in the ovary, whence he concluded that in twelve days it would have laid a hundred eggs; these eggs hatching in six days, which he found to be their natural time, would probably produce fifty males and as many females; and these females attaining their full growth in eighteen days, might each of them be supposed, after twelve days more, to lay also a hundred eggs; which in six days further (the time required to hatch them), might produce a

younger brood of five thousand; so that in eight weeks a single insect might see five thousand of its own descendants.

The phthiriasis, or disease of lice, spoken of by Pliny and other ancient writers, referred to in the sacred scriptures, and treated of by medical writers in modern times, does not appear to be produced by insects of this tribe.

PE'DIGREE. *s.* (*per* and *degré*, *Skinner.*) Genealogy; lineage; account of descent.

PEDILUVIUM. (from *pedes*, the feet; and *lavo*, to wash.) A bath for the feet.

PEDIMENT, in architecture, a kind of low pinnacle; serving to crown porticos, or finish a frontispiece; and placed as an ornament over gates, doors, windows, niches, altars, &c.

The pinnacles of the ancient houses, Vitruvius observes, gave architects the first idea of this noble part; which still retains the appearance of its original.

The parts of the pediment are, the tympanum and its cornice. See ARCHITECTURE.

PE'DLAR, or PE'DLER. *s.* (a contraction from *petty-dealer*) One who travels the country with small commodities (*Shakspeare*).

PE'DLERY. *s.* (from *pedler.*) Wares sold by pedlers (*Swift*).

PEDOBA'PTISM. *s.* (παιδος and βαπτισμα.) Infant baptism.

PEDOBA'PTIST. *s.* (παιδος and βαπτιςης.) One that holds or practises infant baptism.

PEDOMETER, or PODOMETER, formed from πες, *pes*, foot; and μετρον, measure, waywiser; a mechanical instrument, in form of a watch, consisting of various wheels with teeth, catching in one another, all disposed in the same plane; which, by means of a chain or string fastened to a man's foot, or to the wheel of a chariot, advance a notch each step, or each revolution of the wheel; so that the number being marked on the edge of each wheel, one may number the paces, or measure exactly the distance from one place to another. There are some of them which mark the time on a dial-plate, and are in every respect much like a watch, and are accordingly worn in the pocket like a watch.

Figs. 5, 6, and 7, plate 129, serve to illustrate the mechanism and principle of one of Spencer and Perkins's ingenious pedometers, which when worked in the pocket ascertains the number of steps made by the wearer. The external appearance, fig. 5, is somewhat like that of a watch: in the place of the watch-chain is a brass lever A, figs. 5 and 7, one end of which is bent into a hook; the other has a hole *a* through it, as shown in fig. 6, and has a cleft cut in it through the hole; through this hole a wire passes, which wire is fixed between the two studs *b b*, figs. 5 and 7, so as to turn round freely; it also goes through the two arms of the piece B, fig. 6, and is made fast to them so that they turn with it the arm *x*, which is higher than the other, and has a narrow opening cut in it, into which is jointed a piece of steel D by a pin through its top; the end of the lever A has two small screws in it so as to close up the hole *a*, and pinch the wire which passes through the hole tight. When the lever A is moved backwards and forwards, it turns the wire by friction, and moves the piece B up or down till it is stopped by its leaf *d* coming either against the under side of the dial, or against the back of the case, as shown in fig. 7; the lever then slips round the pin. When the piece B is moved up or down, it pushes or pulls the piece D in or out of the case: the end of this is in two branches *e f*; the latter ends in the plain point, the other is bent into a hook; these branches take on each side of a small racket wheel, in fig. 7; which has 10 teeth. When the lever A is moved so as to draw back the piece D, the hook *e* takes one of the teeth of the racket wheel *n*, and moves it round one tooth: at the same time the point *f* slips over the sloping side the opposite tooth, and when the piece D is pushed in, it also moves the wheel round one tooth in the same direction as while the hoof *e* slips over the teeth ready for the next movement. The racket *m* has a pinion of six teeth on its under side, which tacks into a wheel *n* of 60 teeth; on the spindle of this wheel (which projects through the dial) is fastened the long hand *i*, fig. 5. As the wheel *m* makes one revolution for ten strokes of the lever A, and its pinion has one-tenth of the number of teeth in the wheel *n*, it is evident that 100 strokes of the lever will be required for one revolution of the wheel *n*, and hand *i*. The wheel *n* has a pinion of six leaves on it, which gives motion to a wheel *o* of 60 teeth, which turns *r* of 60 teeth, on whose arbour the hand *t*, fig. 5, is fastened: the wheel *o* has a pinion of six leaves on the under side of it, which moves a wheel *y* of 72 teeth, which carries the hand *s*, fig 1; by this arrangement the hand *t* will turn once round for 1000 strokes of the lever A; its dial is divided into 10 each, answering to 100, or 1 revolution of the hand *i*. The index *s* will turn round once for 1200 strokes of the lever; and its circle is divided into 12 parts, each of which denotes one revolution of the hand *t*, or 100 strokes of the lever; the hands are not fastened to their spindle, but can be turned round to set them all to O when it is going to be used. The best method of placing the machine, is with a case upon the thigh, the lever A brought towards the button of the waistband, and if possible, the joints of the lever over the joints of the thigh; so that the lever being over the belly, is at rest, while the motion of the thigh moves the case part of the machine at every step. Set all the hands to O; and when 100 paces are walked, the long hand will have made one revolution, and the hand will move to the figure 1, and so on as before described. Persons of middle stature are found to make about 1000 paces in a mile; but it is best to walk a mile several times, observing each time by the machine, the number of paces each time, and the average of these will serve to calculate by.

PEDRAZA, a town of Spain, in Old Castile, with a castle. It is the birth-place of the

emperor Trajan, and stands on the Cega, near its source, 25 miles N.E. of Segovia.

PEDRO POINT, the most northern point of the island of Ceylon, opposite Point Calymere, on the continent of Hindustan. Lon. 80. 27 E. Lat. 9. 52 N.

PEDRO (St.), one of the islands in the Pacific ocean, called Marquesas. Lon. 138. 51 W. Lat. 9. 58 S.

PEDUNCLE. (from *pedo, pedare*, the same with *fulcire*, or prop or support, and not as Dr. Berkenhout derives it from the noun *pedo*, splay-footed.) A peduncle. By older writers called the foot-stalk; by several moderns the fruit-stalk. To the first of these we object, because we have then the same term for the support of the fructification and of the leaf: to the second, because the peduncle being the support of the flowers as well as the fruit, we are reduced to the absurdity of saying a many-flowered fruit-stalk. To both we object, because peduncle is generally received, and is intelligible in every nation where botany is studied.

The peduncle is the fulcre of the fructification, or a partial stem supporting that only. The explanation in Philos. Bot. is thus expressed: truncus partialis elevans fructificationem, nec folia. In Delin. Pl. thus: fulcrum sustinens fructificationem. In Regn. Veget. it is said to be ramus caulis floriferus; a flower-bearing branch from the stem. The last is the least accurate of the three, and wants the exclusion of the leaves as in the first.

Ray and other old writers use the classical term pediculus. Linnéus probably changed it for pedunculus, because the former signified a sort of insect, as well as the little stalk that supports a fruit.

With respect to its place, a peduncle may be,

1. Radical, or proceeding immediately from the root: as in the primrose.
2. Cauline, or proceeding from the stem.
3. Ramous, or proceeding from a branch. These may be called in English, a root-peduncle; a stem-peduncle; a branch-peduncle.
4. Petiolary, or proceeding from the petiole.
5. Cirrhiferous, or tendril-bearing.
6. Terminal, or proceeding from the top of the stem.
7. Axillary, or proceeding from the angle made by the leaf and stem, or the branch and stem.
8. Opposite-leafed.
9. Lateral flowered, or having the flower on the side of it.
10. Interfoliaceous, or rather among the leaves. I rather think that this is a mistake for, perhaps, intrafoliaceous, within the leaf.
11. Extrafoliaceous. Without, or on the outside of the leaf.
12. Suprafoliaceous. Inserted into the stem higher than the leaf or its petiole.

With respect to its direction, a peduncle may be,

1. Pressed close to the stem.
2. Upright.
3. Spreading.
4. Drooping. Pointing to the ground.
5. Upside down.
6. Bowed or curved downwards.
7. Nodding. Curved downwards more than in n. 6. but less than in n. 4.
8. Rising gradually.
9. Weak, so as to bend with the weight o the flower.
10. Pendulous or loose, so as to tend downwards with the leaf.
11. Stiff and straight.
12. Flexuous, or bending this way and that.
13. Bent backwards as if broken.

With respect to their situation, peduncles may be,

1. Opposite to each other; or, 2. Alternate.
3. Scattered; without any regular order.
4. Verticillate, or in whorls.

With respect to their number, they may be,

1. Solitary or single.
2. Double; two together, or in pairs.

In an umbellule there are several equal peduncles diverging from the same point or centre.

According to the number of flowers which a peduncle bears, it is called uniflorous, biflorous, triflorous, &c. and multiflorous. One, two, three-flowered, and many-flowered.

With respect to its measure, a peduncle is,

1. Short, very short.
2. Long, very long.

With respect to its structure, a peduncle is,

1. Round, cylindric, or rather columnar.
2. Triquetrate. Three-sided.
3. Tetragonous. Four-cornered.
4. Filiform. Like a thread. Of the same thickness in all its parts.
5. Attenuate. Tapering gradually towards the top.
6. Incrassate. Growing gradually thicker towards the top.
7. Clavate. Club-shaped. Thick at the end.
8. Nude, or naked.
9. Squamous. Scaly.
10. Foliate, or leafy.
11. Bracteate, or furnished with bractes.
12. Geniculate, or kneed. Bent at the joints.
13. Articulate, or jointed.

PEDUNCULAR. Growing from a peduncle: as same tendrils do.

PEDUNCULATE. Flower or whorl: in opposition to one that is close to the stem, sessile.

PEEBLES, a borough of Scotland, capital of Peebleshire, seated on the Tweed, over which is an elegant bridge. It has manufactures of carpets and serges, and is noted for its excellent beer. On a projecting rock, near the Tweed, stands Nidpath castle; and on an eminence on the E. stands Horseburg castle. It is 22 miles S. of Edinburg. Lon. 3. 7 W. Lat. 55. 40 N.

PEEBLESHIRE, a county of Scotland, 30 miles long and 12 broad; bounded on the N.

by Edinburgshire, E. by Selkirkshire, S. by Dumfriesshire, and W. by Lanerkshire. It is divided into 16 parishes, and the number of inhabitants in 1801 was 8735. In this county there is not much arable land. Its hills (among which are those of Tweedsmuir) abound with salubrious springs, and feed numbers of sheep and cattle. The principal rivers are the Tweed and Lynne.

PEEK, in the sea language, is a word used in various senses. Thus the anchor is said to be a-peek, when the ship being about to weigh, comes over her anchor in such a manner that the cable hangs perpendicularly between the hawse and the anchor. To heave a-peek, is to bring the peek so that the anchor may hang a-peek. A ship is said to ride a-peek, when lying with her main and fore-yards hoisted up, one end of her yards is brought down to the shrouds, and the other raised up on end; which is chiefly done when she lies in rivers, lest other ships falling foul of the yards should break them. Riding a broad peek, denotes much the same, excepting that the yards are only raised to half the height. Peek is also used for a room in the hold, extending from the bits forward to the stem: in this room men of war keep their powder, and merchantmen their victuals.

PEEL, a town on the W. coast of the isle of Man, situate on a spacious bay. At the S. extremity of the bay is Peel Isle, a rock of great magnitude and height, on the summit of which is a castle, and the cathedral of the isle, dedicated to St. Germain, the first bishop, who lived in the fifth century. The town is much decayed, and the inhabitants are indolent and poor. Lon. 4. 40 W. Lat. 54. 13 N.

To PEEL. *v. a.* (*peler*, Fr. from *pellis*, Lat.) 1. To decorticate; to flay (*Shakspeare*). 2. (from *piller*, Fr. to rob.) To plunder. According to analogy this should be written *pill*.

PEEL. *s.* (*pellis*, Latin; *pelure*, Fr.) The skin or thin rind of any thing.

PEEL. *s.* (*paelle*, Fr.) A broad thin board with a long handle, used by bakers to put their bread in and out of the oven.

PEELE (Francis), a dramatic writer in the reign of queen Elizabeth, a native of Devonshire; was a student of Christ Church college, Oxford, in 1573, where he took his degree of M. A. in 1579. He was a good pastoral poet, and Wood informs us, that his plays were acted with great applause.

PEE'LER. *s.* (from *peel.*) 1. One who strips or flays. 2. A robber; a plunderer (*Tusser*).

To PEEP. *v. n.* 1. To make the first appearance (*Spenser*). 2. To look slily, closely, or curiously; to look through any crevice (*Cleaveland*).

PEEP. *s.* 1. First appearance: as, *at the peep of day*. 2. A sly look (*Swift*).

PE'EPER. *s.* Young chickens just breaking the shell (*Bramstead*).

PE'EPHOLE. PE'EPINGHOLE. *s.* (*peep* and *hole.*) Hole through which one may look without being discovered (*Prior*).

PEER. *s.* (*pair*, French.) 1. Equal; one of the same rank (*Davies*). 2. One equal in excellence or endowments (*Dryden*). 3. Companion; fellow (*Ben Jonson*).

PEERS, in our common law, are those who are impannelled in an inquest upon any man, for the convicting or clearing him of any offence, for which he is called in question; and the reason is, because the course and custom of our nation is, to try every man in such a case by his equals, or peers.

PEERS OF THE REALM, are the nobility of the kingdom, and lords of parliament: who are divided into dukes, marquises, earls, viscounts, and barons; and the reason why they are called peers is, because notwithstanding there is a distinction of dignities in our nobility, yet in all public actions they are equal, as in their voices of parliament, and in passing upon the trial of any nobleman.

It seems clearly, that the right of peerage was originally territorial; that is, annexed to lands, houses, castles, &c.; the proprietors and possessors of which were, in right of those estates, allowed to be peers of the realm, and were summoned in parliament to do suit and service to their sovereign; and when the land was alienated, the dignity passed with its appendant. Thus the bishops still sit in the house of lords, in right of succession to certain ancient baronies annexed, or supposed to be annexed, to their episcopal lands. But afterwards, as alienations grew frequent, the dignity of peerage was confined to the lineage of the party ennobled; and instead of territorial, became personal. Actual proof of a tenure of barony became no longer necessary to constitute a lord of parliament; but the record of the writ of summons to him, or his ancestors, was admitted as a sufficient evidence of the tenure.

Peers are now created either by writ or patent; for those who claim by prescription must suppose either a writ or patent made to their ancestors, though by length of time it may be lost. The creation by writ or the king's letter, is a summons to attend the house of peers, by the style and title of that barony which the king is pleased to confer; that by patents is a royal grant to a subject of any dignity and degree of peerage. The creation by writ is the more ancient way; but a man is not ennobled by it unless he actually takes his seat in the house of lords, and therefore the most usual, because the surest way, is to grant the dignity by patent, which ensures to a man and his heirs, according to the limitations thereof, though he never himself makes use of it. 1 Black. 399.

In criminal cases a nobleman is tried by his peers. Peers shall have the benefit of clergy for the first offence of felony without being burned in the hand.

PEERS (House of). See PARLIAMENT.

To PEER. *v. n.* (by contraction from *appear.*) 1. To come just in sight (*Ben Jonson*). 2. To look narrowly; to peep (*Sidney*).

PEE'RAGE. *s.* (*pairie*, Fr. from *peer.*)

1. The dignity of a peer (*Swift*). 2. The body of peers (*Dryden*).

Accounts of the peerage of Great Britain, with genealogy, arms, &c. have been published by Kearsley and Stockdale.

PEE'RDOM. *s.* (from *peer.*) Peerage.

PEERESS, a woman who is noble by descent, creation, or marriage. For, as we have noblemen of several ranks, so we may have noblewomen: thus king Henry VIII. made Anne Bullen marchioness of Pembroke; king James I. created the lady Compton, wife to sir Thomas Compton, countess of Buckingham, in the lifetime of her husband, without any addition of honour to him. The same king made the lady Finch viscountess of Maidstone, and afterwards countess of Winchelsea, to her and the heirs of her body: and king George I. made the lady Schulenberg duchess of Kendal. If a peeress, by descent or creation, marries a person under the degree of nobility, she still continues noble: but if she obtains that dignity only by marriage, she loses it on her afterwards marrying a commoner; yet, by the courtesy of England, she generally retains the title of her nobility. A countess or baroness may not be arrested for debt or trespass; for though, in respect of their sex, they cannot sit in parliament, they are nevertheless peers of the realm, and shall be tried by their peers, &c.

PEE'RLESS. *a.* (from *peer.*) Unequalled; having no peer (*Milton*).

PEERLESS PRIMROSE, in botany. See NARCISSUS.

PEE'RLESSNESS. *s.* (from *peerless.*) Universal superiority.

PEE'VISH. *a.* (from *beeish, Skinner.*) 1. Petulant; waspish; easily offended; irritable; soon angry; hard to please (*Swift*). 2. Expressing discontent or fretfulness (*Shakspeare*).

PEE'VISHLY. *ad.* Angrily; querulously; morosely (*Hayward*).

PEE'VISHNESS. *s.* Irascibility; querulousness; fretfulness; perverseness (*King Charles*).

PEEWIT, in ornithology. See LARUS.

PEG. *s.* (*pegghe*, Teutonic.) 1. A piece of wood driven into a hole (*Swift*). 2. The pins of an instrument in which the strings are strained (*Shakspeare*). 3. *To take a* PEG *lower.* To depress; to sink (*Hudibras*). 4. The nickname of Margaret.

To PEG. *v. a.* To fasten with a peg (*Evel.*).

PEGANUM. In botany, a genus of the class dodecandria, order monogynia. Calyx five-leaved, or leafless; corol five-petalled; capsule three-celled, three-valved, many-seeded. Four species: Spain, Palestine, Siberia.

PEGASIUM STAGNUM, a lake near Ephesus, which arose from the earth, when Pegasus struck it with his foot.

PEGASUS, among the poets, a winged horse sprung from the blood of Medusa, when Perseus had cut off her head. He received his name from his being born, according to Hesiod, near the sources (πηγη) of the ocean. As soon as he was born, he flew up into heaven, or rather, according to Ovid, fixed his residence on mount Helicon, where, by striking the earth with his foot, he instantly raised a fountain, thence called Hippocrene. He became the favourite of the Muses, and being tamed by Neptune or Minerva, he was given to Bellerophon to conquer the Chimæra. This monster being destroyed, Pegasus threw down his rider, because he attempted to fly to heaven. Pegasus, however, continued his flight up to heaven, and was placed among the constellations by Jupiter.

PEGASUS. In natural history, a genus of the class pisces, order branchiostega. Mouth beneath; snout retractile; upper jaw elongated, denticulate, ensiform, linear; aperture of the gills single, before the pectoral fins; body compressed downwards, articulate with bony incisures, and mailed; ventral fins behind the pectoral. Three species: 1. P. draconis. Dragon-pegasus. Snout conic: inhabits India; from three to four inches long; feeds on worms, the spawn of other fishes and fat earth; body above blueish, with brown, radiate tubercles; beneath broad with a longitudinal eminence in the middle, on which are seated the ventral fins.

2. P. volans. Snout ensiform, denticulate; about three inches long: inhabits India.

3. P. natans. Snout ensiform, unarmed. Inhabits India: size of P draconis; body broad on the fore-part, and narrowed behind, above yellow-brown, beneath broad, smooth, white. See Nat. Hist. Pl. CLXX.

PEGASUS. In astronomy, the name of a constellation of the northern hemisphere, figured in form of a flying horse The stars in this constellation in Ptolemy's Catalogue are twenty, in Tycho's nineteen, in Hevelius's thirty-eight, in the Britannic Catalogue eighty-nine, viz. 0, 3, 3. 8, 12, 63.

PEGEMUS, one of the many names by which the chemists have called mercury.

PEGMA. Among the Romans, a wooden machine, used in theatrical entertainments, which was raised and let down by secret engines, whence it was said to grow. See PEGMATES.

PEGMATES, or rather PEGMARES. In antiquity, a name given to certain gladiators, as well as artificers among the Romans. The ancients sometimes exhibited shows of a sort of moving machines, call pegmata: these were scaffolds variously adorned, somewhat after the manner of those now raised for fire-works. These scaffolds, being made to play, and rise aloft, either threw up into the air the matters wherewith they were charged; and, among the rest, men, who were thus sacrificed to afford the people diversion; or else they precipitated them into holes dug in the ground, where they lighted their funeral piles; or finally into the dens of wild beasts. Both the miserable people thus sacrificed, and the workmen that made and played the machine, were called pegmates, or pegmares.

PEGNAFIEL, a town of Spain, in Old Castile, remarkable for its palace, castle, and fortifications; and its cheeses are said to be the best

in Spain. It is seated on the Douero, 20 miles S.E. of Valladolid. Lon. 4. 0 W. Lat. 41. 41 N.

PEGNA MACOR, a town of Portugal, in Beira, with a castle, 40 miles N.W. of Alcantara. Lon. 6. 32 W. Lat. 39. 50 N.

PEGNARANDA, a town of Spain, in Old Castile, 30 miles S.W. of Olmedo. Lon. 4. 8 W. Lat. 40. 59 N.

PEGOMANTIA. (Πηγομαντεια.) In antiquity, a species of divination, which was performed with fountain water. See HYDROMANCY.

PEGU, a kingdom of Asia, lying to the S.E. of Bengal. It is bounded on the N. by Burmah, on the W. and S. by the ocean, and on the E. by Laos and Siam. Its products are timber for building, elephants, elephants teeth, bees'-wax, lac, saltpetre, iron, lead, tin, petroleum, very fine rubies, small diamonds, and plenty of lead, of which they make their money. It is very fruitful in corn, roots, pulse, and fruits. The government is arbitrary, for the king's will is a law, and yet he does not often abuse his power. The inhabitants are but thinly clad, and the best among them wear neither shoes nor stockings. The women are much fairer than the men, small but well proportioned. If the wife proves false, the husband may sell her for a slave; and if he go astray, she will give him a dose of poison. There are a vast number of temples in this country, mostly of wood, varnished and gilt. The priests have ground allowed them, which they cultivate for their subsistence; and they are said to be strict observers of morality. They are called talapoins, and inculcate charity as the highest virtue; affirming that religion to be the best which teaches men to do the most good. They have idols in their temples, in a sitting posture, cross-legged, and with very large ears. They have various sorts of music, but the pipe and tabor are esteemed the best. In the low flat part of the country, which is liable to be overflowed, the houses are built upon stakes, and in time of inundations, the inhabitants communicate with each other by boats. Pegu was an independent kingdom, till 1751, when it was reduced, by the king of Burmah, to the state of a dependant province.

PEGU, a town in the kingdom of the same name, above 20 miles in circumference; but not one twentieth part is inhabited, for it was ruined by the king of Burmah. It is seated on a river of the same name, 520 miles S. of Ava. Lon. 96. 30 E. Lat. 18. 10 N.

PEINE, a town of Lower Saxony, in the duchy of Brunswick; famous for a battle fought in 1553, when Maurice, elector of Saxony, and the margrave of Brandenburg were killed. It is 17 miles W. of Brunswick. Lon. 10. 19 E. Lat. 52. 25 N.

PEINE FORT ET DURE, (Lat. *pæna fortis et dura*), signifies a special punishment inflicted on those who, being arraigned of felony, refuse to put themselves on the ordinary trial, but stubbornly stand mute; it is vulgarly called pressing to death. See ARRAIGNMENT.

PEIRCE (James), an eminent dissenting minister, was born at Wapping, in London, in the year 1674, and was educated at Utrecht and Leyden; after which he spent some time at Oxford, in order to enjoy the benefit of frequenting the Bodleian library. He then for two years preached the Sunday-evening's lecture at the meeting-house in Miles-Lane, London, and then settled at Cambridge. In 1713 he was removed to a congregation at Exeter, where he continued till the year 1718; when the Calvinists among the dissenters proposing a subscription to articles of faith to be signed by all the dissenting ministers in the kingdom, several articles were proposed to him and Mr. John Hallet, another dissenting minister at Exeter, in order to their subscribing them. They both refused, imagining this proceeding of their dissenting brethren to be an unworthy imposition on religious liberty and private judgement; for which they were ejected from their congregation. Upon this, a new meeting was opened for them at Exeter, of which Mr. Peirce continued minister till his death, in 1726. He was a man of the strictest virtue, exemplary piety and great learning. He wrote, 1. Exercitatio philosophica de Homœmeria Anaxagorea. 2. Thirteen pieces on the Controversy between the Church of England and the Dissenters. 3. Ten pieces on the Controversy about the Ejectment at Exeter. 4. Six pieces on the Doctrine of the Trinity. 5. A Paraphrase and Notes on the Epistles of St. Paul to the Colossians, Philippians, and Hebrews. 6. An Essay in favour of giving the Eucharist to Children. 7. Fourteen Sermons.

PEIRESC (Nicolas Claude Fabri), descended from an ancient family of Pisa, in Italy, and born in 1580. He spent five years in study at the jesuits' college, and became famous for his discoveries in antiquities, particularly in medals. He went to Rome in 1600, and staid six months in that capital, as well to view the jubilee as to inspect the monuments of the fine arts; after which he returned to Padua, where he consulted the learned Rabbi Solomon, upon the Hebrew, Samaritan, Syriac, and Arabic languages. His knowledge of the Greek was considerable, and his proficiency in mathematics procured him the friendship of Galileo and Fabricius of Aquapendente. Upon his obtaining the degree of LL. D. at Aix, in 1604, he made a learned speech on the antiquity of the doctorial ornaments. In 1606 he accompanied the French ambassador to England. He died of a suppression of urine, in 1637. His works were numerous, at the head of which stands his Historia Provinciæ Galliæ Narbonensis, and the last on the catalogue Linguæ Orientales, &c.

PEISHORE, or PISHOUR, a considerable city of Hindustan Proper, in the province of Cabul. It is subject to the king of Candahar, and is 50 miles N.W. of Attock. Lon. 96. 54 E. Lat. 32. 44 N.

PEITZ, a town of Upper Saxony, in the Ucker marche of Brandenburg. In the neighbourhood are iron mines, and manufactures of pitch and turpentine. It is 30 miles S.S.W.

of Frankfort on the Oder. Lon. 8. 35 E. Lat. 52. 5 N.

PEKAN, in mastiology. See MUSTELA.

PEKING, the capital of the empire of China, in the province of Pe-tche-li. Its name signifies the Northern Court, to distinguish it from Nan-king, the Southern Court, where the emperor formerly resided. This capital forms an oblong square, and is divided into two cities; one inhabited by Chinese, the other by Tartars. These two cities, exclusive of the suburbs, are nearly 14 miles in circumference. The walls of the city are 28 feet high, 24 thick at the base, and 12 at the top; and there are spacious towers at 70 feet distance from each other. The gates are high, and well arched, supporting buildings of nine stories high; the lowest of which is for the soldiers when they come off guard: they are nine in number, three in the S. wall, and in each of the other sides two. The middle gate, on the S. side, opens into the Tartar or imperial city, which is a space within the general inclosure, about a mile from N. to S. and three-fourths of a mile from E. to W. with a rivulet winding through it. A wall of large red polished bricks, 20 feet high, covered with a roof of tiles painted yellow and varnished, surrounds this space, in which are contained the imperial palace and gardens, the public offices, lodgings for the ministers, the eunuchs, artificers, and tradesmen belonging to the court. Between the other two gates in the S. wall, and the opposite ones on the N. side of the city, run two straight streets, each four miles in length, and 120 feet wide. One street of the same width runs from one of the eastern to the corresponding western gate, but the other is interrupted by the imperial city, round the walls of which it is carried. The other streets branch from these main streets at right angles, and are very narrow. The houses have no windows nor openings to the street, except the great shops; most of them are poorly built, and have only a ground-floor. It is astonishing to see the concourse of people that are in the main streets, yet not one Chinese woman among them, and the confusion occasioned by the number of horses, camels, mules, asses, wagons, carts, and chairs; without reckoning the several mobs which gather about the jugglers, ballad-singers, &c. Persons of distinction have always a horseman to go before them and clear the way. All the great streets are guarded by soldiers, who patrole night and day with swords by their sides, and whips in their hands, to chastise those who make any disturbance, or take them into custody. The little streets have lattice gates at their entrance into the great streets, which are shut up at night, and guarded by soldiers, who suffer no assemblies in the streets at that time. The emperor's palace and garden occupies two thirds of the Tartar city, is surrounded by a brick wall, two miles in length, with pavilions at each corner encompassed by galleries, supported by columns: the architecture of the stupendous pile of buildings of which the palace consists is entirely different from that of the Europeans; and they are covered with tiles of a shining beautiful yellow The temples and the towers of Peking are so numerous, that it is difficult to count them. Provisions of all kinds are exceedingly plentiful, they being, as well as the merchandise, brought from all parts by canals from the rivers, and always crowded with vessels of different sizes; and within the walls are several hundred acres of land under cultivation. An earthquake which happened here, in 1731, buried above 100,000 persons in the ruins of the houses. The inhabitants are estimated at 2,000,000. A Russian church is established here, with a seminary, in which the students are permitted to reside for the purpose of learning the Chinese language. Since this establishment, many interesting publications have appeared at Petersburg, relative to the laws, history, and geography of China, translated from the originals published at Peking. This city stands in a fertile plain, 60 miles S. of the great wall. Lon. 116. 27 E. Lat. 39. 54 N.

PELAGIANS, a christian sect who appeared about the fifth or end of the fourth century. They maintained the following doctrines: 1. That Adam was by nature mortal, and, whether he had sinned or not, would certainly have died. 2. That the consequences of Adam's sin were confined to his own person. 3. That new-born infants are in the same situation with Adam before the fall. 4. That the law qualified men for the kingdom of heaven, and was founded upon equal promises with the gospel. 5. That the general resurrection of the dead does not follow in virtue of our Saviour's resurrection. 6. That the grace of God is given according to our merits. 7. That this grace is not granted for the performance of every moral act; the liberty of the will, and information in points of duty, being sufficient, &c The founder of this sect was

PELAGIUS, a native of Great Britain; but whether of England, Scotland, or Wales, is as uncertain as it is immaterial. He was born towards the close of the fourth century, and educated in the monastery of Banchor, in Wales, of which he became a monk, and afterwards abbot. In the early part of his life he went over to France, and thence to Rome, where he had the insolence to promulgate certain opinions somewhat different from those of the infallible church. His morals being irreproachable, he gained many disciples; and the dreadful heresy made so rapid a progress, that, for the salvation of souls, it became necessary for the pope to exert his power. Pelagius, to avoid the danger, in the year 409 passed over to Sicily, attended by his friend and pupil Celestius. In 411 they landed in Africa, continued some time at Hippo, and were present at the famous conference between the Catholics and Donatists, which was held at Carthage in 412. From thence they travelled to Egypt; and from Egypt, in 415, to Palestine, where they were graciously received by John, bishop of Jerusalem. In the same year Palagius was cited to appear before a council of seventeen

bishops, held at Diospolis. They were satisfied with his creed, and absolved him of heresy. The African bishops, however, being displeased with their proceedings, appealed to the Roman pontiff: he first approved, and afterwards condemned, the opinions of Pelagius, who, with his pupil Celestius, was publicly excommunicated; and all the bishops who refused to subscribe the condemnation of the Pelagian heresy were immediately deprived. What became of him after this period is entirely unknown; but it seems very probable that he retired to Banchor, and died abbot of that monastery. He wrote, 1. Expositionum in epist. Paulinas, lib. xiv. 2. Epistola ad Demetriadem de virginitate. 3. Explanationis symboli ad Damasum. 4. Epistola ad viduam duæ. 5. De libero arbitrio. These and many other fragments are scattered among the works of St. Jerome. They are also collected by Garnerius, and published in Append. Op. Mercatoris, p 373. *Cave.*

PELAGIUS I. (Pope). He was a Roman by birth, and ascended the papal chair in 555. He endeavoured to reform the manners of the clergy; and when the city was besieged by the Goths, he obtained from Totila, their general, many concessions in favour of the citizens. He died in 560.

PELAGIUS II. (Pope). He was elected after the death of Benedict I. in 578. He laboured earnestly, but without success, to reconcile the bishops of Istria and Venice to the Roman see; and he opposed John, patriarch of Constantinople, who had assumed the title of oecumenical bishop. Pelagius died of the plague which desolated Rome in 590.

PELAGNISI, an island in the Grecian Archipelago, about eight miles in circumference. Lon. 24 12 E. Lat. 39. 30 N.

PELAGRA. The disease called the pelagra does not appear to have been noticed by any of our nosologists. Indeed few accounts of it have hitherto been published, although the peculiar symptoms with which it is attended, and the fatal consequences which generally ensue from it, render it equally curious and important. In certain districts, as Milan and Padua in Italy, where it is peculiarly prevalent, it is computed to attack five inhabitants out of every hundred. The following account of this singular disease is extracted from Dr. Jansen's treatise on the subject, who had seen the disease at Milan.

About the month of March or April, when the season invites the farmers to cultivate their fields, it often happens that a shining red spot suddenly arises on the back of the hand, resembling the common erysipelas, but without much itching or pain, or indeed any other particular inconvenience. Both men and women, girls and boys, are equally subject to it. Sometimes this spot affects both hands, without appearing on any other part of the body. Not uncommonly it arises also on the shins, sometimes on the neck, and now and then, though very rarely, on the face. It is sometimes also seen on the breasts of women, where they are not covered by the clothes, but such parts of the body as are not exposed to the air are very seldom affected; nor has it ever been observed to attack the palm of the hand, or the sole of the foot. This red spot elevates the skin a little, producing numerous small tubercles of different colours; the skin becomes dry and cracks, and the epidermis sometimes assumes a fibrous appearance. At length it falls off in white furfuraceous scales; but the shining redness underneath still continues, and in some instances remains through the following winter. In the mean time, excepting this mere local affection, the health is not the least impaired, the patient performs all his rural labours as before, enjoys a good appetite, eats heartily, and digests well. The bowels are generally relaxed at the very commencement of the disease, and continue so throughout its whole course. All the other excretions are as usual; and, in females, the menses return at their accustomed periods, and in the proper quantity. But what is most surprising is, that in the month of September, when the heat of the summer is over, in some cases sooner, in others later, the disorder generally altogether disappears, and the skin resumes its natural healthy appearance. This change has been known to take place as early as the latter end of May or June, when it has only been in its earliest stage. The patients, however, are not now to be considered as well; the disease hides itself, but is not eradicated; for no sooner does the following spring return, but it quickly reappears, and generally is accompanied with severer symptoms. The spot grows larger, the skin becomes more unequal and hard, with deeper cracks. The patient now begins to feel uneasiness in his head, becomes fearful, dull, less capable of labour, and much wearied with his usual exertions. He is exceedingly affected with the changes of the atmosphere, and impatient both of cold and heat. Nevertheless, he generally gets through his ordinary labour, with less vigour and cheerfulness indeed than formerly, but still without being obliged to take to his bed; and, as he has no fever, his appetite continues good, and the chylopoietic viscera perform their proper functions. When the pelegra has even arrived at this stage, the returning winter, nevertheless, commonly restores the patient to apparent health; but the more severe the symptoms have been, and the deeper root the disease has taken, the more certainly does the return of spring produce it with additional violence. Sometimes the disease in the skin disappears, but the other symptoms remain notwithstanding. The powers both of the mind and body now become daily more enfeebled; peevishness, watchings, vertigo, and at length complete melancholy supervene. Nor is there a more distressing kind of melancholy any where to be seen than takes place in this disease. "On entering the hospital at Legnano," says Dr. Jansen, "I was astonished at the mournful spectacle I beheld, especially in the women's ward. There they all sat, indolent, languid, with downcast looks,

their eyes expressing distress, weeping without cause, and scarcely returning an answer when spoken to; so that a person would suppose himself to be among fools and mad people: and indeed with very good reason; for gradually this melancholy increases, and at length ends in real mania.

"Many, as I had an opportunity of observing in this hospital, were covered with a peculiar and characteristic sweat, having a very offensive smell, which I know not how better to express than by comparing it to the smell of mouldy bread. A person accustomed to see the disease would at once recognize it by this single symptom. Many complained of a burning pain at night in the soles of the feet, which often deprived them of sleep. Some with double vision; others with fatuity; others with visceral obstructions; others with additional symptoms. Nevertheless, fever still keeps off, the appetite is unimpaired, and the secretions are regularly carried on. But the disease goes on increasing. the nerves are more debilitated, the legs and thighs lose the power of motion, stupor or delirium come on, and the melancholy terminates in confirmed mania. In the hospital at Legnano, I saw both men and women in this maniac state. Some lay quiet; others were raving, and obliged to be tied down to the bed, to prevent them from doing mischief to themselves and others. In almost all these the pulse was small, slow, and without any character of fever. One woman appeared to have a slight degree of furor uterinus; for at the sight of men she became merry, smiled, offered kisses, and by her gestures desired them to come towards her. Some were occupied in constant prayers; some pleased themselves with laughter, and others with other things. But it was remarkable, that all who were in this stage of the disease had a strong propensity to drown themselves. They now begin to grow emaciated, and the delirium is often followed by a species of tabes. A colliquative diarrhœa comes on, which no remedy can stop, as also has been observed in nostalgia. Sometimes in the pelagra the diarrhœa comes on before the delirium, and the delirium and stupor mutually interchange with each other. The appetite often suddenly failed, so that the sick will sometimes go for near a week without tasting food. Not uncommonly it returns as suddenly, so that they eagerly devoured whatever was offered them, and this even at times when they are horribly convulsed. The convulsions with which they are attacked are most shocking to see, and are of almost every kind, catalepsy excepted, which has been described by writers. I saw one girl in bed, who was violently distorted by opisthotonos every time she attempted to rise. Some are seized with emprosthotonos; and others with other species of tetanus. At length syncope and death close the tragedy, often without any symptom of fever occurring through the whole course of the disease. The first stage of the pelagra, in which the local affection only takes place, Dr. Jansen observes, continues in some instances for a great length of time; persons being occasionally met with in whom it has lasted six or eight, or even fifteen years, disappearing regularly every winter, or returning again in the spring. This occasions some of the inhabitants to pay little attention to it; although, in other cases, it reaches its greatest height after the second or third attack. It appears that this disease is not infectious, and that the causes producing it are yet unascertained. It has been supposed by some to arise from the heat of the sun's rays; and hence it is now and then called *mal de sole*; but this does not produce any similar disease in other parts of the world, where it is in an equal or even much greater degree than at Milan: no disease in any respect resembling it having hitherto been noticed in such regions, except the lepra asturiensis described by Thiery, and after him by Sauvages. In this a tremour of the head and trunk of the body takes place, which does not happen in the pelagra. This, however, is the principal difference in the two diseases.

PELARGONIUM. Crane-bill. In botany, a genus of the class monadelphia, order heptandria. Calyx five-parted, the upper division ending in a capillary, nectariferous tube running down the peduncle; petals five irregular, filaments ten unequal, three, and sometimes five of them barren; fruit beaked, separated into five capsules, each tipped with a spiral awn bearded on the inside. A hundred and twenty-three species; one or two natives of Australasia, the rest Cape plants. They must be thus divided into tribes.

A. Stemless; root rapaceous; umbel compound.

B. Nearly stemless; root tuberous.

C. Herbaceous, or somewhat shrubby.

D. Shrubby; leaves undivided, not angular.

E. Shrubby; leaves angular, lobed, or palmate.

F. Shrubby; leaves three-cleft, and ternate.

G. Shrubby; leaves pinnatifid and pinnate.

H. Shrubby; leaves decompound and more than decompound.

Nearly thirty varieties of this genus are cultivated in our gardens, many of them possessing a flower nearly resembling that of geranium. They may all be increased by seeds sown in pots in kitchen-garden mould in an early part of the spring, and plunged into hot-beds. As they grow up they should be gradually accustomed to the open air, in order to be placed out in it in the summer season in sheltered situations. The shrubby sorts, however, are more commonly increased by cuttings of the young branches, which should be planted in a shady border in the summer, or in pots plunged into a hot-bed; which last is the best method. All are highly ornamental, and afford considerable variety in collections of green-house or pleasure ground plants.

PELASGI, a people of Greece, supposed to be one of the most ancient in the world. They first inhabited Argolis in Peloponnesus, which from them received the name of Pelasgia, and about 1883 years B. C. they passed into Æmo-

nia, and were afterwards dispersed in several parts of Greece. From these different changes of situation in the Pelasgians, all the Greeks are indiscriminately called Pelasgians, and their country Pelasgia, though it should be confined to Thessaly, Epirus, and Peloponnesus. The Pelasgians seem to have received their name from Pelasgus, the first king, and founder of their nation, who was the son of Jupiter and Niobe.

PELATÆ, among the ancient Athenians, were free-born citizens, who were reduced by poverty to the necessity of serving for wages.

PELATO. Salpingius, in myology. See CIRCUMFLEXUS.

PELECANUS. Pelican. In zoology, a genus of the class aves, order anseres. Bill straight, hooked at the point, and furnished with a nail; nostrils an obliterated slit; face nakedish; legs equally balancing the body, all the four toes palmate. Thirty-one species, scattered over the globe; three or four of them common to our own country. These birds are extremely expert at catching fishes with their long bills, and are often tamed for that purpose; they are gregarious and very voracious: the claw of the middle toe is frequently serrate. The following are the chief species:

1. P. onocrotalus. White pelican. White; gullet pouched; bill from fifteen to sixteen inches long, red, but when young, yellow; upper mandible depressed, broad, the lower forked; gular pouch flaccid, membranaceous, capable of great distention: irids hazle; gape of the mouth large; head naked at the sides, covered with a flesh-colour skin.

The white pelican is by far the largest bird of this genus, and is even supposed to exceed, in size, the swan, and albatross; but notwithstanding its size, it supports itself easily upon the air, and darts with great rapidity upon its prey; being furnished with such enormous wings, that, when these are extended, the breadth of the bird is from ten to twelve feet. It feeds, like the cormorant, upon fishes which it catches by diving: like the cormorant, too, it is universally spread over all the warm latitudes, of both the old and new continents. In some places, however, pelicans are more numerous than in others; for travellers assert, that the lakes of Judea and Egypt, and the rivers Nile and Strymon, when viewed from the mountains, appear white, with the vast flocks of these birds that continually cover their surface.

They are seen issuing forth to the tracts where fishes abound, every morning, when they continue rising up into the air, and diving into the water, by turns, till they have filled the large bag under their chin. After they have thus collected a sufficient store of provisions, they retire to the cliff of some neighbouring rock, till it is digested. There they remain, slumbering in a profound apathy; till roused in the evening, by the calls of their voracious appetite, they again resume their labours.

As in the other birds of this genus, the four toes of the pelican are all directed forward, and completely palmated; the legs and beak are of a pale red, varying according to the age of the bird. The latter is of the enormous length of eighteen inches; is thick at the base, but tapers off towards the point, where it terminates in a hook. The under mandible consists of two flexible branches, to each of which are attached the sides of that large bag, which extends from the point of the bill to the throat. This bag, when empty, the bird has a power of contracting into a small size, under the lower chap; when extended, however, it is capable of containing above ten quarts of water, and will admit a man's leg. This extraordinary pouch consists of a skin, covered with a short down, smooth and soft, like silk.

This bag of the pelican may be considered as its crop; for it serves all the purposes of that intestine in other birds: in other birds, it is placed at the bottom; but, in this, at the top of the gullet, where, having less warmth to aid digestion, the food is carried to the young in a more fresh and sound state. In disgorging the food for her family, the mother presses the bottom of her sack upon her breast, and thus discharges its contents; hence the absurd fable of her opening her breast, and feeding her young with her blood.

Nothing can exceed the torpid and indolent habits of these birds, but their gluttony; it is only the powerful stimulation of hunger that will induce them to change their situation, or ascend into the air. They must, however, fly or starve; and when once they stir abroad, they will each devour, at a single meal, as many fishes as would satisfy six men. They commit prodigious devastation, both upon the fresh water and the sea; and will swallow a fish of eight pounds weight. So great is their voracity, that, on a failure of fishes, they will devour rats, and other small quadrupeds.

The indolent habits of the pelican characterize every part of its economy. After its evening labours are over, as if spent with the fatigues of the day, it retires to a tree near the shore, on which it perches all night, and often a great part of the following day, in dismal solemnity, and apparently half asleep. The invincible laziness of the female allows her to make no preparation for incubation, or for the protection of her young, when excluded. She drops her eggs upon the bare ground, to the number of five or six, without seeming to have any choice in the place where they are laid. Her attachment to the place and affection for her young inspire her with no courage in defending her offspring: she tamely sits and suffers her eggs to be taken from under her; and, now and then, only ventures to peck, or cry out, when a person offers to beat her away.

The young, when excluded, are fed with the fishes that have been, for some time, macerated in her bag. They are easily tamed; and, whatever food is given them, they always first commit it to the bag, and afterwards swallow it at their leisure. They are both useless and disagreeable domestics; for their gluttony is insatiable, and their flesh is so unsavory, as to be rejected and despised by the savages. Great numbers are killed, indeed, by the natives of America, for the sake of their bags, which they convert into purses, and tobacco pouches. When carefully prepared, this membrane becomes as soft as silk; and is, sometimes, embroidered by the Spanish ladies for work-bags. In Egypt, the sailors use it, while still attached to the two under chaps, for holding water or baling their boats.

2. P. carbo. Cormorant, or corvorant. Tail rounded; body black; head subcrested; bill blackish, the base of the lower mandible covered with a yellowish skin, extending under the chin and forming a pouch; irids green, chin white surrounded with a yellowish arch; tail long, lax, feathers fourteen; thighs with a white spot dotted with black; legs black; size nearly that of a goose: the black plumage of the body ornamented, in certain aspects with rich glosses of green and blue.

This species has been found by navigators in almost every part of the ocean, where its flesh, although extremely rancid, affords a repast, of which the sailors sometimes gladly partake. The most frequent residence of the cormorant, when on shore, is the high cliffs of those stupendous rocks which hang over the sea, such as the precipices of St. Kilda. There, to the spectator, at the height of three quarters of a mile above the surface of the sea, the vast waves that roll between the new and old world appear like the curl raised on a lake by a gentle breeze. On these tremendous heights, the roaring of the Atlantic is heard like the soft murmurs of a brook; and the cormorant, together with thousands of water-fowls that skim below, seems scarcely so large as a swallow.

The cormorant is, perhaps, the most voracious of all birds, owing to the vast number of worms that fill its intestines, and accelerate the progress of digestion. Spurred on by an insatiable appetite, it dives into the sea like an arrow, and with such well-directed aim, that its prey seldom escapes. It remains under the water sometimes for a considerable time, but seldom appears above its surface, without a fish crosswise in its bill. In order to swallow the fish, when thus caught, it tosses it up into the air, and, with remarkable agility, seizes it by the head, before it reaches the water: in that position, by dilating its throat, it devours a fish apparently much thicker than its own neck

In England, this bird was formerly domesticated, and trained to fish for its owner. When thus employed, a ring was fastened round its neck, to prevent it from swallowing its prey; and, as often as it caught a fish, it was instructed to carry it to its master. In China, the inhabitants still avail themselves of the service of the cormorant in fishing. One person can manage a great number of them, which he carries out hooded upon the prow of his boat into a lake. On a signal given, they disperse over the lake; and each, according to his success, returns loaded to his master, who receives his booty, and again dispatches him to his employment. When the fisherman has caught what he judges to be sufficient, he calls in his birds, and unties their necks; and either feeds them with a part of what they have taken, or sends them back to fish on their own account.

It is only hunger which gives activity to the cormorant: for, when glutted with food, it is the most dull and indolent of all birds: it will then remain, for five or six hours, without motion, in a state of listless apathy.

3. P. graculus. Shag. Sometimes, though erroneously, called crane. Tail rounded; body black, beneath brown; tail-feathers twelve: head and neck black with a green gloss; middle of the belly dusky; legs black. Inhabits northern Europe and Iceland: two and a half feet long.

Another variety found near the Cape, with yellow chin and wedged tail.

A third variety, blackish, beneath brown; feathers above edged with black: inhabits Cayenne, and the Caribbee islands: twenty-six inches long.

The general manners of this variety agree with those of the cormorant; they breed in the same places; and what is a singularity in webfooted birds, both will perch upon and build in trees; both swim with their heads quite erect, and are shot with difficulty, for like the grebes and divers, as soon as they see the flash of a gun they pop under water, and never rise but at a considerable distance.

4. P. Sula. Booby. Tail wedged, body whitish; primary quill-feathers tipt with blackish; face red; bill grey, brownish at the base; irids pale-ash; chin bald, yellowish; body beneath white; legs yellowish. Inhabits South America and the neighbouring isles.

These birds are also extremely indolent, and allow themselves to be taken on the rigging of ships, or knocked down with sticks, till a whole flock be massacred to the very last bird. With the same senseless imbecility they abandon themselves to the depredations of the man-of-war bird. These birds no sooner perceive them, than they dive upon them from the air; not to kill them, but with an intention to make them disgorge the fish they may have swallowed. The cowardly booby generally vomits its prey, on the first attack; and again undertakes the task of searching for new spoils, which, when acquired, expose it to new insults from these invaders. Sometimes the booby does not discharge its load upon the first attack, but utters doleful cries, as if calling for help. The man-of-war bird, in this case, still pursues, redoubling his strokes, without relaxation or pity, till the terrified animal disgorges all its fish, which are snatched up by the voracious plunderer, before they reach the water.

The booby most common in the West Indies is of a middle size, between that of a goose and a duck. Its length, from the tip of the bill to that of the tail, is about two feet and an half: its bill is about five inches; and its tail upwards of ten.

5. P. Aquilus. Frigate pelican. Tail forked; body and orbits black; bill red. Male: pouch deep red; wing-coverts rufous. Female: belly white. Inhabits within the tropics; three feet long; extent of the wings fourteen feet; builds in trees or rocks, and lays one or two flesh-colour eggs spotted with red. In consequence of the great strength and extent of its wings, this bird flies often so high as hardly to be seen, and to a distance from land so daring and extensive as to be often the sole object between the heavens and the sea, that presents itself to the eye of the wearied sailor. It passes over immense tracts of the ocean, at one flight; and when a single day is not sufficient, it continues its route during the darkest night; only stopping for refreshment in places where its food is abundant. From the immense size of its wings, this bird raises itself into the clouds; and while the storm roars below, it can look down from its elevated retreat, where it enjoys a perfect calm, upon the furious agitation of the elements beneath it. At other times, it swims with an easy motion through the tranquil air, in quest of its prey, or hangs motionless above the water, watching an opportunity of darting upon the devoted animal which shall first appear upon its surface.

Thus equipped for plunder, the frigate pelican is one of the most formidable tyrants of the ocean. Like the eagle upon land, he exercises a sort of dominion over the other aquatic tribes: happily, however, for their security, he seldom extends his excursions beyond the tropics, although he is found in the torrid zone, through every part of the globe. We have already seen with how much rigour he tyrannises over the tribe of boobies, in making them disgorge their food, after it is swallowed. When in flocks, sometimes their audacity has prompted the man-of-war birds to brave man himself. Upon the island of Ascension, a cloud of them attacked a crew of French sailors; and, till some of them were struck down, endeavoured to snatch the meat from their hands.

But the length of their wings, which gives these

birds such rapidity in the air, serves only to embarrass them when upon the ground. When perched, they have the same difficulty in taking flight as the booby; consequently they are sometimes knocked down, before they can make their escape. It, is, probably, owing to the excessive length of their wings, that these, and some others of the palmated birds, perch upon trees, and the points of rocks, as from such places they can most easily launch into the air.

6. P. Bassanus. Gannet. Tail wedged; body white; bill and primary quill-feathers black; face blue; irids yellowish; tail-feathers twelve.

- β. Another variety, brown spotted with white, beneath white, orbits naked, blackish.
- γ. A third variety, brown with triangular white spots, beneath whitish, spotted with brown; bill, wings, tail and legs brown.

This last variety inhabits Cayenne: the two former Europe and America.

The gannets are birds of passage, and make their appearance in the British isles in the summer season. They arrive in the month of March, and depart in August or September, according as they have been more or less disturbed in the business of nidification; those whose nests have not been plundered being always soonest ready to depart. The chief of their food consisting in herrings, it is probable that their arrival and departure are influenced by the motions of these fishes, which they are seen constantly attending during their whole circuit round the British islands. Hence the gannet is a bird extremely useful to fishermen, in pointing out the tracts which the shoals of herring pursue. It migrates southward in winter, after a similar food, as far as the coast of Portugal, where it is seen diving for pilchards, in the mouth of the Tagus.

In the breeding season, the gannets retire to the high rocks of the small uninhabited islands round the coast. They are found in vast numbers upon the isle of Ailsa, in the frith of Clyde; upon the rocks of St. Kilda, near the Orkneys; upon the Bass, in the vicinity of Edinburgh; and upon the Skelig isles, off the coast of Ireland. The surface of these dreary precipices is almost entirely covered, in the months of May and June, with nests, eggs, and young birds. The immense numbers of gannets and other birds, that fly around these rocky isles, appear, to a person at some distance, like a hive of bees: and, when he approaches the foot of the rocks, the air is immediately darkened with the vast flocks that rise from their nests; and so loud is their noise, that he can hardly hear the voice of a person standing by him.

The nests of the gannets are formed generally of sea-weeds, or any substance found floating upon the water. The female lays only one egg in the year; but, if that be carried away, she will lay twice, and even thrice, to fulfil the purposes of nature. The young are of a much darker hue than the old birds: they remain in their nests till they be almost full size, where they grow immensely fat. In that state they are taken, and dispersed among the inhabitants, who prize their flesh rather as a kind of variety, and a fashionable dish, than as an agreeable food. In St. Kilda, however, the natives view them in a very different light. They constitute the principal support of that half-famished people, through the year; and we are assured, that no fewer than twenty-two thousand young birds are consumed annually, besides a vast quantity of eggs.

Nor is this food, indifferent as it must prove on constant repetition, easily procured; for the wretched inhabitants who go in quest of it are let down by a rope from the top of the precipice, and hang dangling in the air, sometimes two hundred fathoms from the ground. They are sometimes in danger from the insecure footing of those who hold the rope above, but more frequently from the tumbling down of loose stones by the swinging of the rope. When the person thus suspended has beat down all the young birds around, with his fowling staff, he is raised or lowered to a different part of the rock, as occasion requires; and, when he has completely destroyed all in one quarter, he is removed to another. In this adventurous manner do the inhabitants of the northern regions provide their annual stock of food. Both the eggs and fowls, which are thus procured at the hazard of their lives, are preserved in small pyramidal stone buildings, covered with ashes, to defend them from moisture. See Nat. Hist. Pl. CLXXXIV.

PELECOIDES, or Hatchet-form, in geometry, a figure in form of a hatchet. As the figure ABCDA, contained under the semicircle BCD and the two quadrantal arcs AB and AD. Pl. 129. fig. 8.

The area of the pelecoides is equal to the square AC, and this again is equal to the rectangle BE. It is equal to the square, because the two segments AB and AD, which it wants of the square on the lower part, are compensated by the two equal segments BC and CD, by which it exceeds on the upper part. And the square is equal to the rectangle BE, because the triangle ABD, which is half the square, is also half the rectangle BE of the same base and height with it.

PELEGRINO, a mountain on the N. coast of Sicily, nearly two miles W. of Palermo. On this mount is a cavern, in which is the image of St. Rosolia, who is said to have died here; and round the cave of this saint (who is the patroness of Palermo) a church is built, where priests attend, to watch the precious relics, and receive the offerings of the pilgrims.

PELETHITES. The Pelethites and Cherethites were famous under the reign of king David. They were the most valiant men in the army of that prince, and had the guard of his person. See Ezekiel xxv. 16. Zephaniah ii. 5. 1 Samuel xxx. 14. and 2 Samuel xv. 18. and xx. 7. and Patrick's Comm. Pool's Annot. and Delany's History of the Life of David.

PELETHRONII, an epithet given to the Lapithæ, because they inhabited Pelethronium, in Thessaly; or because one of their number bore the name of Pelethronius. It is to them mankind are indebted for the invention of the bit with which they tamed their horses, &c.

PELEUS, in fabulous history, a king of Thessaly, son of Æacus and Endeis, the daughter of Chiron. He married Thetis, one of the Nereids, and was the only one among mortals who married an immortal. Being accessary to the death of his brother Phocus, he retired to the court of Eurytus, who reigned at Phthia. He was purified of his murder by Eurytus, who gave him his daughter Antigone in marriage. Some time after this, Peleus and Eurytus went to the chase of the Calydonian boar, where the

father-in-law was accidentally killed by an arrow which his son-in-law had aimed at the beast. This unfortunate event obliged him to retire to Iolchos. Here Astydamia, the wife of Acastus, king of the country, became enamoured of him, and when she found him insensible to her passion, she accused him of attempts upon her virtue. The monarch did not put him to death, but caused him to be tied to a tree on mount Pelion, that he might become the prey of the wild beasts of the place; but Jupiter, who knew the innocence of Peleus, ordered Vulcan to set him at liberty. Peleus afterwards punished the ill-treatment which he had received from Acastus. He forcibly took Iolchos, drove the king from his possessions, and put to death the wicked Astydamia. After the death of Antigone, Peleus courted Thetis, who rejected his suit because he was a mortal. Having offered a sacrifice to the gods, Proteus at length informed him that to obtain Thetis he must surprize her asleep in her grotto, near the shores of Thessaly. This advice was followed, and Thetis, unable to escape from the grasp of Peleus, at last consented to marry him. Their nuptials were celebrated with the greatest solemnity by all the gods, who made them each the most valuable presents. The goddess of discord was the only one of the deities who was not present. (See DISCORDIA, PARIS.) From the marriage of Peleus and Thetis was born Achilles. (See ACHILLES.) The death of Achilles was the source of grief to Peleus, and Thetis, to comfort her husband, promised him immortality, and ordered him to retire into the grottos of the island of Leuce, where he would see and converse with the manes of his son.

PELEW ISLANDS, or PALAOS, a group of islands in the Pacific ocean, lying between 134 and 136 E. lon. and 6 and 8 N. lat. They are encircled on the W. side by a reef of coral; and the names of some of the principal are Oroolong, Emungs, Emillegue, Artingal, Corooraa, and Pelelew. They are well covered with trees of various kinds and sizes; and every part of that called Corooraa, to which Pelew appeared to be the capital, seemed to bear the marks of industry and good cultivation. Capt. Wilson, of the Antelope East India packet, who was wrecked here in 1783, represents the natives simple in their manners, delicate in their sentiments, friendly in their disposition, and, in fine, a people that do honour to the human race. The astonishment which those, who first discovered the English, manifested on seeing their colour, plainly showed, that they had never before seen a white man. They had no idea of the nature of powder and shot, and were exceedingly amazed on seeing its effects. Their principal arms consist of bamboo darts, from five to eight feet long, pointed with the wood of the betel-nut tree; but there are short ones for different marks, which are thrown by means of a stick two feet long. The chiefs wear a bone round one of their wrists, in the form of a bracelet, which, being a mark of great honour conferred by the king, is never to be parted with but with life They are not all of the same degree, as appeared from a difference in the bone they wore. Captain Wilson was invested with the highest order of the bone. With respect to property in these islands, a man's house or canoe is considered as his own, as is also the land allotted to him, as long as he occupies and cultivates it; but whenever he removes to another place, the ground reverts to the king The natives make canoes out of the trunks of trees, some large enough to carry 30 men. Yams and cocoanuts, being their chief articles of subsistence, are attended with the utmost care; and the milk of the latter is their common drink. On particular occasions, they add to their ordinary fare certain sweetmeats, and a sweet beverage, obtained by the aid of a syrup, extracted either from the palm-tree or the sugar-cane. The houses are raised about three feet from the ground, the foundation beams being laid on large stones, whence spring the upright supports of their sides, which are crossed by other timbers grooved together, and fastened by wooden pins; the intermediate space being closely filled up with bamboos and palm-tree leaves, platted together. The tops of the house are covered with bamboos and palm-tree leaves; and the inside is without any division, forming one great room. As to domestic implements, they have little baskets, nicely woven from slips of the plantain-tree, and wooden baskets with covers, neatly carved and inlaid with shells. No one goes abroad without a basket, which usually contains some betel-nut, a comb, knife, and a little twine. The best knives are made of a piece of the large mother-of-pearl oyster, ground narrow, and the outward side a little polished. The combs are made of the orange-tree, of which there are a few of the Seville kind; the handle and teeth are fastened in the solid wood. The fishing hooks are of tortoise-shell; and twine, cord, and fishing nets, are well manufactured from the husks of the cocoanut. Of the plantain leaf are formed mats, which serve the people as beds. They also use a plaintain leaf at meals, instead of a plate; and the shell of a cocoa-nut supplies the place of a cup. There are vessels of a kind of earthen ware, of a reddish brown colour, in which they boil their fish, yams, &c. A bundle of cocoanut husks serves them for a broom; and thick bamboos, with bores five or six inches in diameter, are their buckets or cisterns. The shell of the tortoise is here remarkably beautiful; and the natives have discovered the art of moulding it into little trays or dishes, and spoons. Some of the great ladies have also bracelets of the same manufacture, and earrings inlaid with shells. The natives, in general, are stout and well made, rather above the middling stature, and of a deep copper colour. Their hair is long, and generally formed into one large loose curl round their heads. The men are entirely naked: but the women wear two little aprons, one before, the other behind. Both sexes are tattowed, and have their teeth made black by art. They are very expert at

swimming; and the men are such admirable divers, that they will readily fetch up any thing from the bottom of the sea. Such an opinion had the king of the island entertained of the English, that, on their departure, he suffered his second son, Lee Boo, to accompany them to England, where this hopeful youth died of the smallpox in 1784. The East India Company erected a monument over his grave in Rotherhithe churchyard. These islands are encircled on the W. side by a reef of coral.

PELF. *s.* (In low Latin, *pelfra.*) Money; riches (*Sidney. Swift*).

PELIAS, the twin brother of Neleus, was son of Neptune by Tyro, the daughter of Salmoneus. His birth was concealed by his mother, who wished her father to be ignorant of her incontinence. He was exposed, but his life was preserved by shepherds, who named him Pelias, from a spot of the colour of lead in his face. Some time after this, Tyro married Cretheus, king of Iolchos. Meantime Pelias visited his mother, and after the death of Cretheus, he unjustly seized his kingdom, which belonged to the children of Tyro. But Jason, the son of Æson, the eldest of the children of Cretheus, afterwards boldly demanded the kingdom which he had usurped. Pelias then, in order to divert his attention, told him he would voluntarily resign the crown, if he went to Colchis to avenge the death of Phryxus, whom Æetes had cruelly murdered. This expedition, which was likely to be attended with much glory, was readily undertaken by Jason. (See JASON). Upon the return of Jason from Colchis, the daughters of Pelias, called Peliades, solicited Medea (see MEDEA) to restore their father to youth, as she had Æson, her father-in-law; but after the Peliades had, by her directions, cut their father's body to pieces, and had drawn all the blood from his veins, on the assurance that Medea would replenish them by her incantations, Medea suffered the flesh to be totally consumed in a cauldron of boiling water, and refused to give the Peliades the promised assistance. The Peliades were four in number, Alceste, Pisidice, Pelopea, and Hippothoe, to whom Hysinus adds Medusa. After this parricide, they fled to the court of Admetus, where Acastus, the son-in-law of Pelias, pursued them, and took their protector prisoner. The Peliades died, and were buried in Arcadia.—2. A Trojan chief, wounded by Ulysses during the Trojan war. He survived the ruin of his country, and followed the fortune of Æneas. (*Virg.*)—The ship Argo is called Pelias arbor, built of the trees of mount Pelion.—The spear of Achilles. (See PELION.)

PELICAN, in ornithology. See PELECANUS.

PELIGNI, a people of Italy who dwelt near the Sabines and Marsi. Corfinium and Sulmo were the chief towns of this country.

PELION and PELIOS, a celebrated mountain of Thessaly. In their wars against the gods, the giants, as the poets mention, placed mount Ossa upon Pelion, to scale the heavens with more facility. The celebrated huge spear of Achilles, which none but the hero could wield, had been cut down on this mountain, and thence called Pelias. It was a present from his preceptor Chiron.

PELISSA, a town of Lower Hungary, capital of a county of the same name. It is seated near the Danube, 15 miles N. of Buda. Lon. 18. 20 E. Lat. 47. 40 N.

PELISSANE, a town of France, in the department of the Mouths of the Rhone, 15 miles W.N.W. of Aix. Lon. 5. 21 E. Lat. 43. 26 N.

PELL (John), an English mathematician of Southwyke, Sussex, was born in 1610, educated at Stenning school, and at 13 entered at Trinity college, Cambridge, where he applied himself to mathematics with unusual assiduity. After taking his master's degree, he was incorporated at Oxford in 1631, and by his various publications he acquired so much reputation, that he was invited in 1639 to fill up a professor's chair at Amsterdam, to which he succeeded 1643. In 1646 he settled at Breda as professor of philosophy and mathematics, at the request of the prince of Orange, and in 1652 returned to his native country. In 1654 he was sent by Cromwell as English resident to Switzerland, and returned a little before the protector's death. In 1661 he was ordained by the bishop of Lincoln, and obtained from the crown the rectory of Fobbing in Essex, to which the bishop of London afterwards added the rectory of Lavingdon in that county. Though respectable as a scholar, and a man of science, Dr. Pell was unfortunately very inattentive to the state of his domestic affairs, and consequently he became poor in his old age, and was even confined in the king's bench as a debtor. He died 1685, and was interred by the charity of Busby, master of Westminster school, and Sharp, rector of St. Giles'.

Pell was the author of various works, and among them the following:

1. An Exercitation concerning Easter; 1644, in 4to.

2. A Table of 10,000 square numbers, &c. 1672, folio.

3. An Inaugural Oration at his entering upon the Professorship at Breda.

4. He made great alterations and additions to Rhonius's Algebra, printed at London 1668, 4to, under the title of, An Introduction to Algebra; translated out of the High Dutch into English, by Thomas Branker, much altered and augmented by D. P. (Dr. Pell). Also a Table of Odd Numbers, less than 100,000, shewing those that are incomposite, &c. supputated by the same Thomas Branker.

5. His Controversy with Longomontanus concerning the Quadrature of the Circle; Amsterdam, 1646, 4to.

He likewise wrote a Demonstration of the 2d and 10th books of Euclid; which piece was in MS. in the library of lord Brereton in Cheshire: as also Archimedes's Arenarius, and the greatest part of Diophantus's six books of

Arithmetic; of which author he was preparing, August, 1644, a new edition, in which he intended to have corrected the translation, and made new illustrations. He designed likewise to publish an edition of Apollonius, but laid it aside, in May, 1645, at the desire of Golius, who was engaged in an edition of that author from an Arabic manuscript given him at Aleppo eighteen years before. Letters of Dr. Pell to sir Charles Cavendish, in the Royal Society.

Some of his manuscripts he left at Brereton in Cheshire, where he resided some years, being the seat of William lord Brereton, who had been his pupil at Breda. A great many others came into the hands of Dr. Busby; which Mr. Hook was desired to use his endeavours to obtain for the Society. But they continued buried under dust, and mixed with the papers and pamphlets of Dr. Busby, in four large boxes, till 1755; when Dr. Birch, secretary to the Royal Society, procured them for that body, from the trustees of Dr. Busby.

The collection contains not only Pell's mathematical papers, letters to him, and copies of those from him, &c. but also several manuscripts of Walter Warner, the mathematician and philosopher, who lived in the reigns of James I. and Charles I.

Dr. Pell invented the method of ranging the several steps of an algebraical calculus, in a proper order, in so many distinct lines, with the number affixed to each step, and a short description of the operation or process in the line: He also invented the character $\div$ for division, ⊛ for involution, and ɯ for evolution.

PELLA, a celebrated town of Macedonia, which became the capital of the country, after the ruin of Edessa. Philip, king of Macedonia, was educated there, and Alexander the Great was born there, whence he is often called Pellæus juvenis. The tomb of the poet Euripides was in the neighbourhood.

PELLERIN, a town of France, in the department of Lower Loire, situate on the Loire, with a harbour for small vessels, 10 miles N. of Nantes, and 13 S.E of Painbœuf. Lon 1. 44 W. Lat 47. 23 N.

PE'LLET. *s.* (from *pile*, Lat. *pelote*, Fr.) 1, A little ball (*Sandys*). 2. A bullet; a ball to be shot (*Ray*).

PE'LLETED. *a.* (from *pellet.*) Consisting of bullets (*Shakspeare*).

PE'LLICLE. *s.* (*pellicula*, Lat.) 1. A thin skin (*Sharp*). 2. It is often used for the film which gathers upon liquors impregnated with salt or other substance, and evaporated by heat.

PELLISON, or PELLISON FONTANIER (Paul), one of the finest geniuses of the 17th century, was the son of James Pellison counsellor at Castres. He was born at Beziers in 1624, and educated in the Protestant religion. He studied, with success the Latin, Greek, French, Spanish, and Italian tongues, and applied himself to the reading the best authors in these languages; after which he studied the law at Castres with reputation. In 1652 he purchased the post of secretary to the king, and five years after became first deputy to M. Fouquet. He suffered by the disgrace of that minister; and in 1661 was confined in the Bastille, from whence he was not discharged till four years after. During his confinement he applied himself to the study of controversy; and in 1670 abjured the Protestant religion. Louis XIV. bestowed upon him an annual pension of 2000 crowns; and he likewise enjoyed several posts. In 1676 he had the abbey of Giment, and some years after the priory of St. Orens at Auch. He died in 1693. His principal works are, 1. The History of the French Academy. 2. Reflections on religious disputes, &c. in 4 vols. 12mo. 3. The History of Louis XIV. 4. Historical Letters and Miscellanies, in 3 vols. 12mo.

PELLITORY. In botany. See ACHILLEUS.

PELLITORY OF SPAIN. See ANTHEMIS and PYRETHRA.

PE'LLMELL. *ad.* (*pesle mesle*, Fr.) Confusedly; tumultuously; one among another; with confused violence (*Hudibras*).

PELLS. *s.* (*pellis*, Lat.) Clerk of the *pells*, an officer belonging to the exchequer, who enters every teller's bill into a parchment roll called *pellis acceptorum*, the roll of receipts (*Bailey*).

PELLU'CID. *a.* (*pellucidus*, Lat.) Clear; transparent; not opake; not dark (*Newton*).

PELLUCI'DITY. PELLU'CIDNESS. *s.* (from *pellucid.*) Transparency; clearness; not opacity (*Locke. Keil*).

PELOPEA, or PELOPIA, a daughter of Thyestes, the brother of Atreus. She had a son by her father, who knew not that she was his own daughter. Some suppose that Thyestes purposely committed this incest, as the oracle had informed him that his wrongs should be avenged, and his brother destroyed by a son who should be born from him and his daughter. This proved too true. Pelopea afterwards married her uncle Atreus, who kindly received in his house his wife's illegitimate child, called Ægysthus, because preserved by goats, (αιγες) when exposed in the mountains. Ægysthus became his uncle's murderer. (See ÆGYSTHUS.)

PELOPEIA, a festival observed by the people of Elis in honour of Pelops.

PELOPIDAS, a celebrated general of Thebes, son of Hippoclus, descended of an illustrious family, and remarkable for his immense possessions, which he bestowed with great liberality to the poor. He took great delight in the conversation of Epaminondas (see EPAMINONDAS); who despised riches, and from their friendship and intercourse the Thebans derived the most considerable advantages. No sooner had the interest of Sparta prevailed at Thebes, and the friends of liberty been banished from the city, than Pelopidas, who was in the number of the exiles, resolved to free his country from foreign slavery. Mean while Epaminondas, who had been left by the tyrants at Thebes, as a worthless philosopher, animated the youths of the city, and at last Pelopidas, and eleven of his associates, entered Thebes, massacred the

friends of the tyranny, and freed their country from foreign masters. After this successful enterprize, Pelopidas was placed at the head of the government, and so confident were the Thebans of his abilities, that they successfully re-elected him 13 times to fill the office of governor of Bœotia. Epaminondas shared with him the sovereign power, and it was to their valour and prudence that the Thebans were indebted for a celebrated victory at the battle of Leuctra. In a war which Thebes carried on against Alexander, tyrant of Pheræ, Pelopidas was appointed commander, and by his imprudence was taken prisoner, but Epaminondas restored him to liberty. The perfidy of Alexander irritated him, and he was killed bravely fighting in a celebrated battle in which his troops obtained the victory, B. C. 564 years. He received an honourable burial. Pelopidas is admired for his valour, as he never engaged an enemy without obtaining the advantage, and it has been justly observed, that with Pelopidas and Epaminondas the glory and the independence of the Thebans rose and set.

PELOPONNESIACUM BELLUM, Peloponnesian war, a celebrated war which continued for 27 years with various success, between the Athenians and the inhabitants of Peloponnesus, with their respective allies. It is the most famous and the most interesting of all the wars which happened between the inhabitants of Greece. The famous battle of Ægospotamos, where Lysander, the Lacedemonian commander, attacked the Athenian fleet, and almost totally destroyed it, may be said to have been the finishing stroke of this long and obstinate contest. Of one hundred and eighty sail, only nine escaped, eight of which fled, under the command of Conon, to the island of Cyprus, and the other carried to Athens the melancholy news of the defeat. During four months, negociations were carried on with the Spartans, by the aristocratical part of the Athenians, and after a negociation of four months, it was at last agreed, that, to establish the peace, the fortifications of the Athenian harbours must be demolished, together with the long walls which joined them to the city; all their ships, except twelve, were to be surrendered to the enemy; they were to resign every pretension to their ancient dominions abroad; to recall from banishment all the members of the late aristocracy; to follow the Spartans in war, and in the time of peace, to frame their constitution according to the will and the prescriptions of their Peloponnesian conquerors. The terms were accepted, and the enemy entered the harbour, and took possession of the city. The walls and fortifications were instantly levelled with the ground. This memorable event happened about 404 years before the Christian era, and 30 tyrants were appointed by Lysander over the government of the city. To the correct and authentic writings of Thucydides and Xenophon we are principally indebted for the circumstantial detail of the events and revolutions of this war.

PELOPONNESUS, a celebrated peninsula, which comprehends the most southern parts of Greece. It received this name from Pelops, who settled there, as the name indicates (πελοπος νησος, the island of Pelops). It had been called before Argia, Pelasgia, and Argolis. Its present name is Morea. Peloponnesus was divided into six different provinces, Messenia, Laconia, Elis, Arcadia, Achaia propria, and Argolis, to which some add Sicyon. These provinces all bordered on the sea shore, except Arcadia. It was conquered some time after the Trojan war, by the Heraclidæ, who had been forcibly expelled from it. Its inhabitants rendered themselves illustrious, like the rest of the Greeks, by their genius, their fondness for the fine arts, the cultivation of learning, and the profession of arms. (See PELOPONNESIACUM BELLUM.) The Peloponnesus scarce extended 200 miles in length, and 140 in breadth. It was separated from Greece by the narrow isthmus of Corinth.

PELOPS, a celebrated prince, son of Tantalus, king of Phrygia. He was murdered by his father, who wished to try the divinity of the gods who had visited Phrygia, by placing on their table the limbs of his son. The gods perceived his cruelty, and they all refused to touch the meat, except Ceres, whom the recent loss of her daughter had rendered melancholy. She ate one of the shoulders of Pelops, and therefore when Jupiter restored him to life, he placed a shoulder of ivory instead of that which Ceres had devoured. This shoulder had an uncommon power, and it could heal by its very touch every complaint, and remove every disorder. Pindar, however, confutes the tradition of his ivory shoulder. Some time after, the kingdom of Tantalus was invaded by Tros, king of Troy, on pretence that he had carried away his son Ganymedes. Tantalus defeated, was obliged to fly with his son Pelops, and to seek a shelter in Greece. Pelops came to Pisa, where he became one of the suitors of Hippodamia, the daughter of king Œnomaus, whom he conquered in a chariot race, and thereby gained his wife. (See OENOMAUS.) When he had established himself on the throne of Pisa, Hippodamia's possession, he extended his conquests over the neighbouring countries, and from him the peninsula, of which he was one of the monarchs, received the name of Peloponnesus. Pelops, after death, received divine honours. The children of Pelops by Hippodamia were Pitheus, Trœzen, Atreus, Thyestes, &c. besides some by concubines. The time of his death is unknown. Some suppose that the Palladium of the Trojans was made with the bones of Pelops. His descendants were called Pelopidæ. Some suppose that Pelops first instituted the Olympic games in honour of Jupiter, and to commemorate the victory which he had obtained over Œnomaus.

PELORUM, or PELORUS, one of the three great promontories of Sicily, near Charybdis. It lies near the coast of Italy, and received its name, as some assert, from Pelorus, the pilot of the ship which carried Annibal away from Italy.

Latin.), 1. Skin;

hide (*Brown*). 2. The quarry of a hawk all torn (*Ainsworth*).

To PELT. *v. a.* (*polkern*, German. *Skinner*.) 1. To strike with something thrown (*Atterbury*). 2. To throw; to cast (*Dryden*).

PELTA, a small, light, manageable buckler, used by the ancients. It was worn by the Amazons. The pelta is said by some to have resembled an ivy leaf in form; by others it is compared to the leaf of an Indian fig-tree; and by Servius to the moon in her first quarter.

PELTA, in botany, a flat fructification on some lichens; resembling a round shield; whence its name.

PELTARIA, in botany, a genus of the class tetradynamia, order siliculosa. Silicle entire, somewhat orbicular, compressed, flat, not opening; one or three-seeded. Three species, herbs of the Cape.

PELTATE LEAF. A target-shaped leaf. Having the petiole inserted into the disk of the leaf, instead of the edge or base, as is most usual. As in nymphæa, hernandia, colocasia, hydrocotyle, tropæolum, geranium peltatum.—Applied also to a stigma, when it is round and flat, like a pelta.

PE'LTING. *a.* This word, in *Shakspeare*, signifies mean; paltry; pitiful.

PE'LTMONGER. *s.* (*pellio*, Latin; *pelt* and *monger*.) A dealer in raw hides.

PELVIS. (from πελυς, a basin, because it is shaped like a basin used in former times.) The cavity below the belly. It is composed of four bones, viz. two OSSA INNOMINATA, the SACRUM, and OS COCCYGIS, which see. It contains the organs of generation, the bladder, and the rectum. See UTERUS, OVARIA, VAGINA, VESICA URINARIA, PROSTATE GLAND, RECTUM, &c.

PELVIS (Ligaments of). The articulation of the os sacrum with the last lumbar vertebra, and with the ossa innominata, is strengthened by means of a strong transverse ligament, which passes from the extremity and lower edge of the last lumbar vertebra, to the posterior and internal surface of the spine of the ilium. Other ligaments are extended posteriorly from the os sacrum to the os ilia on each side, and, from the direction of their fibres, may be called the lateral ligaments. Besides these, there are many shorter ligamentous fibres, which are seen stretching from the whole circumference of the articulating surfaces of these two bones. But the most remarkable ligaments of the pelvis are the two sacro-ischiatic ligaments, which are placed towards the posterior and inferior part of the pelvis. One of these may be called the greater, and the other the lesser sacro-ischiatic ligament. The first of these is attached to the posterior edge of the os sacrum, to the tuberosity of the ilium, and to the first of the three divisions of the os coccygis. Its other extremity is inserted into the inner surface of the tuberosity of the ischium. At its upper part it is of considerable breadth, after which it becomes narrower, but expands again before its insertion into the ischium, and, extending along the tuberosity of that bone to the lower branch of the os pubis, where it terminates in a point, forms a kind of falx, one end of which is loose, while the other is fixed to the bone. The lesser sacro-ischiatic ligament is somewhat thicker than the former, and is placed obliquely before it. It extends from the transverse processes of the os sacrum, and the tuberosity of the spine of the ilium on each side, to the spine of the ischium. These two ligaments not only serve to strengthen the articulation of the ossa innominata with the os sacrum, but to support the weight of the viscera contained in the pelvis, the back and lower part of which is closed by these ligaments. The posterior and external surface of the greater ligament likewise serves for the attachment of some portions of the gluteus maximus and gemini muscles. The symphysis pubis is strengthened internally by a transverse ligament, some of the fibres of which are extended to the obturator ligament.

PELUSIUM, a town of Egypt, situate at the entrance of one of the mouths of the Nile, called from it Pelusian. It is about 20 stadia from the sea, and received the name from the lakes and marshes (πηλος) in its neighbourhood. It is now in ruins.

PEMBA, a town of Congo, capital of a province of the same name. Lon. 18. 25 E. Lat. 7. 30 S.

PEMBA, or PENDA, an island in the E. Indian Ocean, near the coast of Africa, about 100 miles in circumference, governed by a king, tributary to the Portuguese. Lon. 40. 0 E. Lat. 5. 50 S.

PEMBERTON (Dr. Henry), a learned physician and mathematician, was born at London, in 1694. After studying grammar at a school, and the higher classics under Mr. John Ward, afterwards professor of rhetoric at Gresham college, he went to Leyden to attend the lectures of the celebrated Boerhaave, to qualify himself for the profession of medicine. Here also, as well as in England, he constantly mixed with his professional studies those of the best mathematical authors. From Leyden he went to Paris, in order to perfect himself in the practice of anatomy, which he readily attained, being naturally dexterous in all manual operations. Having obtained his main object, he returned to London; enriched likewise with other branches of scientific knowledge, and a choice collection of mathematical books, both ancient and modern. After his return he assiduously attended St. Thomas's hospital, to acquire the London practice of medicine and surgery; though he seldom practised, owing to his delicate state of health. In 1719 he went again to Leyden to take his degree of M. D. where he was most kindly entertained by his friend Boerhaave. On his second return to London, he became more intimately acquainted with Dr. Mead, sir Isaac Newton, and other eminent men. And being an active man, he was highly useful to his friends; as, to Newton in preparing a new edition of his Principia, and in writing a popular account of his philosophical discoveries;

to Mr. Robins in bringing him forward, and writing some pieces printed in the 2d volume of that gentleman's collection of Tracts, &c. Being chosen professor of physic in Gresham college, he undertook to give a course of lectures on chemistry, which was improved every time he delivered it, and was published in 1771, by his friend Dr. James Wilson. After a long and laborious life spent in improving science, and assisting its cultivators, Dr. Pemberton died in 1771, at 77 years of age.

Besides the doctor's writings abovementioned, he wrote, 1. Epistola ad Amicum de Cotesii inventis; demonstrating Cotes's celebrated theorem, and shewing his other theorems by logarithms may be effected by the circle and hyperbola. 2. Observations on Poetry, especially the epic, occasioned by Glover's Leonidas. 3. A plan of a free state, with a king at its head (not published). 4. Account of the ancient ode, printed in the preface to West's Pindar. 5. A paper on the dispute about Fluxions, printed in the 2d vol. of Robins's Tracts. 6. On the Alteration of the Style and Calendar. 7. On reducing the Weights and Measures to one Standard. 8. A Dissertation on Eclipses. 9. On the Loci Plani, &c. His numerous communications to the Royal Society, in a variety of interesting subjects, extend from the 32d to the 62d vol. of the Philos. Transactions.

After his death many valuable pieces were found among his papers, viz. A short History of Trigonometry from Menelaus to Napier. A comment on an English translation of Newton's Principia. Demonstrations of Spherics and Spherical Projections, enough to compose a treatise on those subjects. A Dissertation on Archimedes's Screw. Improvements in Gauging. In a given latitude to find the point of the ecliptic which ascends the slowest. To find when the oblique ascension differs most from the arch to which it belongs. On the principles of Mercator's and middle latitude sailing. To find the heliacal rising of a star. To compute the moon's parallax. To determine the course of a comet in a parabolic orbit. Most of these are very neat and perspicuous.

PEMBRIDGE, a town in Herefordshire, with a market on Tuesday, seated on the Arrow, 12 miles N.W. of Hereford, and 145 W.N.W. of London. Lon. 2. 42 W. Lat. 52. 14 N.

PEMBROKE, the capital of Pembrokeshire, with a market on Saturday. It is seated on the innermost creek of Milford Haven, over which are two bridges, but the navigation to it is become injured by the rubbish of the limestone quarries near it. It is surrounded by a wall with three gates, has a castle on a rock, and two churches. It is governed by a mayor, sends one member to parliament, and is 10 miles S.E. of Haverfordwest, and 237 W. by N. of London. Lon. 4. 55 W. Lat. 51. 43 N.

Pembroke (Thomas), an English painter, and pupil of Larroon, whose manner he imitated. He painted several pictures for the earl of Bath, and died in London about 1730, at the age of 28.

Pembroke (Mary Herbert), was wife of Henry earl of Pembroke, and sister of the celebrated sir Philip Sidney, who dedicated his Arcadia to her, which occasioned it to be called the countess of Pembroke's Arcadia. She translated a French tragedy called Antonius.

PEMBROKESHIRE, a county of South Wales, 37 miles long and 28 broad; surrounded on all sides by the sea, except on the E. where it is bounded by Carmarthenshire and Cardiganshire. It contains 335,600 acres; is divided into seven hundreds, and 145 parishes; has one city and seven market towns, and sends three members to parliament. The number of inhabitants in 1801 was 56,280. The rivers are inconsiderable. A great part of the county is plain, and tolerably fertile, consisting of rich meadow and arable land. The N.E. part alone is mountainous; which, however, yields good pasture for sheep and cattle.

PEMPHIGUS. (πεμφιγος, from πεμφιξ, a bubble). A fever attended by successive eruptions of vesicles about the size of almonds, which are filled with a yellowish serum, and in three or four days subside. The fever may be either synocha or typhus. It is a genus of disease in the class pyrexia and order exanthemata of Cullen. It is divided according to the size of the eruption into major and minor.

PEN. *s.* (*penna*, Latin.) 1. An instrument of writing (*Dryden*). 2. Feather (*Spenser*). 3. Wing (*Milton*). 4. (from pennan, Saxon.) A small enclosure; a coop (*L'Estrange*).

To Pen. *v. a.* pret. and part. pass. *pent*. (pennan and pinban, Saxon.) 1. To coop; to shut up; to incage; to imprison in a narrow place (*Bacon*). 2. (from the noun; pret. and part. pass. *penned*.) To write (*Digby*).

Pen, a little instrument, usually formed of a quill, serving to write with. Pens are also sometimes made of silver, brass, or iron.

Pens (Dutch), are made of quills that have passed through hot ashes, to take off the grosser fat and moisture, and render them more transparent and brittle.

Pen (Fountain), is a pen made of silver, brass, &c. contrived to contain a considerable quantity of ink, and let it flow out by gentle degrees, so as to supply the writer a long time without being under the necessity of taking fresh ink.

The fountain pen is composed of several pieces, as shewn at the bottom of pl. 129, where the middle piece F carries the pen, which is screwed into the inside of a little pipe, which again is soldered to another pipe of the same bigness as the lid G; in which lid is soldered a male screw, for screwing on the cover, as also for stopping a little hole at the place and hindering the ink from passing through it. At the other end of the piece F is a little pipe, on the outside of which the top-cover H may be screwed. In the cover there goes a port-crayon, which is to be screwed into the last-mentioned pipe, in order to

stop the end of the pipe, into which the ink is to be poured by a funnel. To use the pen, the cover G must be taken off, and the pen a little shaken, to make the ink run more freely.

There are, it is well known, some instruments used by practical mathematicians, which are called pens, and which are distinguished according to the use to which they are principally applied; as for example, the drawing pen, &c. an instrument too common to require particular description in this place.

PEN (Musical), a kind of fountain pen, contrived to deliver ink freely from five equidistant nibs at once, and thus formed for the purpose of ruling five equidistant lines, such as music is written on, at once.

PEN (Geometric), is an instrument in which, by a circular motion, a right line, a circle, an ellipse, and other mathematical figures, may be described. It was first invented and explained by John Baptist Suardi, in a work entitled Nuovo Istromenta per la Descrizzione di diverse Curve Antichi e Moderne, &c. Several writers had observed the curves arising from the compound motion of two circles, one moving round the other; but Suardi first realized the principle, and first reduced it to practice. It has been lately introduced with success into the steam-engine by Watt and Bolton. The number of curves this instrument can describe is truly amazing; the author enumerates not less than 1273, which, he says, can be described by it in the simple form.

For a minute description of the geometrical pen, we must refer to Adams's Geometrical and Graphical Essays, and the 2d vol. of Prony's Architecture Hydraulique.

PENÆA, in botany, a genus of the class tetrandria, order monogynia. Calyx two-leaved; corol campanulate; style quadrangular; capsule square, four-celled, eight-seeded. Nine species; two of Ethiopia, the rest of the Cape: from one of the Æthiopian species is supposed to be obtained the concrete juice of the dispensatories, entitled sarcocolla; whence the species is denominated P. sarcocolla. It is probable that the other Æthiopian species, P. mucronata, affords a similar fluid. See SARCOCOLLA.

PE'NAL. *a.* (*penal*, Fr. from *pœna*, Lat.). 1. Denouncing punishment; enacting punishment (*South*). 2. Used for the purposes of punishment; vindictive (*Milton*).

PENA'LITY. *s.* (*penalité*, old Fr.) Liableness to punishment; condemnation to punishment (*Brown*).

PE'NALTY. *s.* (from *penalité*, old French). 1. Punishment; censure; judicial infliction (*Locke*). 2. Forfeiture upon non-performance (*Shakspeare*).

PE'NANCE. *s.* (*penence*, old French.) Infliction either public or private, suffered as an expression of repentance for sin (*Bacon*).

PENATES, certain inferior deities among the Romans, who presided over houses and the domestic affairs of families. They were called Penates, because they were generally placed *in penitissima ædium parte*. The place where they stood was afterwards called penetralia, and they themselves received the name of Penetrales. According to some, the gods Penates were divided into four classes; the first comprehended all the celestial, the second the sea gods, the third the gods of hell, and the last all such heroes as had received divine honours. The statues of the Penates were generally made of wax, ivory, silver, or earth, according to the affluence of the worshipper, and the only offerings they received were wine, incense, fruits, and sometimes the sacrifice of lambs, sheep, goats, &c. Some have confounded the Lares and the Penates, but they were different.

PENCE. *s.* The plural of *penny*.

PE'NCIL. *s.* (*penicillum*, Latin.) 1. A small brush of hair which painters dip in their colours (*Dryden*). 2. A black lead pen, with which, cut to a point, we write without ink (*Watts*). 3. Any instrument for writing without ink.

To PE'NCIL. *v. n.* (from the noun). To paint (*Shakspeare*).

PENCIL OF RAYS, in optics, is a double cone, or pyramid of rays, joined together at the base; one of which hath its vertex in some point of the object, and has the crystalline humour, or a glass for its base; and the other has its base on the same glass or crystalline, but its vertex in the point of convergence.

PENDANT, an ornament hanging at the ear, frequently consisting of diamonds, pearls, and other precious stones.

PENDANTS, in heraldry, parts hanging down from the label, to the number of three, four, five, or six at most, resembling the drops in the Doric frieze.

PENDANTS OF A SHIP, are those streamers or long colours which are split and divided into two parts ending in points, and hung at the head of masts, or at the yard-arm ends.

PENDENNIS, a castle in Cornwall, on a hill of the same name, on Falmouth bay. It was built by Henry VIII. for the security of the coast; and on the opposite side of the bay is another called St. Maws. It is a little to the S.E. of Falmouth, the harbour of which it defends.

PE'NDENCE. *s.* (from *pendeo*, Latin.) Slopeness; inclination (*Wotton*).

PE'NDENCY. *s.* (from *pendeo*, Latin.) Suspense; delay of decision (*Ayliffe*).

PE'NDENT. *a.* (*pendens*, Lat.) 1. Hanging (*Shakspeare*). 2. Jutting over (*Shaks.*). 3. Supported above ground (*Milton*).

PENDING. *a.* (*pendente lite*, Latin.) Depending; remaining yet undecided (*Ayl.*).

PENDULOSITY. PE'NDULOUSNESS. *s.* (from *pendulous*.) The state of hanging; suspension (*Brown*).

PE'NDULOUS. *a.* (*pendulus*, Lat.) Hanging; not supported below (*Ray*).

PENDULUM, in mechanics, any heavy body, so suspended as that it may swing backwards and forwards, about some fixed point, by the force of gravity.

These alternate ascents and descents of the pendulum are called its oscillations, or vibrations; each complete oscillation being the descent from the highest point on one side, down to the lowest point of the arch, and so on up to the highest point on the other side. The point round which the pendulum moves, or vibrates, is called its centre of motion, or point of suspension: and a right line drawn through the centre of motion, parallel to the horizon, and perpendicular to the plane in which the pendulum moves, is called the axis of oscillation. There is also a certain point within every pendulum, into which, if all the matter that composes the pendulum were collected, or condensed as into a point, the times in which the vibrations would be performed would not be altered by such condensation; and this point is called centre of oscillation. The length of the pendulum is usually estimated by the distance of this point below the centre of motion, being always near the bottom of the pendulum; but in a cylinder or any other uniform prism or rod, it is at the distance of one third from the bottom, or two-thirds from and below the centre of motion.

The length of a pendulum, so measured to its centre of oscillation, that it will perform each vibration in a second of time, thence called the second's pendulum, has, in the latitude of London, been generally taken at $39\frac{2}{10}$ or $39\frac{1}{5}$ inches; but by some very ingenious and accurate experiments, the late celebrated Mr. George Graham found the true length to be $39\frac{128}{1000}$ inches, or $39\frac{1}{8}$ inches very nearly.

The length of the pendulum vibrating seconds at Paris was found by Varin, Des Hays, De Glos, and Godin, to be $440\frac{5}{8}$ lines; by Picard $440\frac{1}{2}$ lines; and by Mairan $440\frac{17}{30}$ lines.

Galileo was the first who made use of a heavy body annexed to a thread, and suspended by it, for measuring time, in his experiments and observations. But according to Sturmius, it was Riccioli who first observed the isochronism of pendulums, and made use of them in measuring time. After him Tycho, Langrene, Wendeline, Mersenne, Kircher, and others, observed the same thing; though it is said, without any intimation of what had been done by Riccioli. But it was the celebrated Huygens who first demonstrated the principles and properties of pendulums, and probably the first who applied them to clocks. He demonstrated, that if the centre of motion was perfectly fixed and immoveable, and all manner of friction, and resistance of the air, &c. removed, then a pendulum, once set in motion, would for ever continue to vibrate without any decrease of motion, and that all its vibrations would be perfectly isochronal, or performed in the same time Hence the pendulum has universally been considered as the best chronometer or measurer of time. And as all pendulums of the same length perform their vibrations in the same time, without regard to their different weights, it has been suggested, by means of them, to establish an universal standard for all countries.

Pendulums are either simple or compound; and each of these may be considered either in theory, or as in practical mechanics among artisans.

A simple pendulum, in theory, consists of a single weight, as A, plate 132, fig. 1, considered as a point, and an inflexible right line AC, supposed void of gravity or weight, and suspended from a fixed point or centre, C, about which it moves.

A compound pendulum, in theory, is a pendulum consisting of several weights moveable about one common centre of motion, but connected together so as to retain the same distance both from one another, and from the centre about which they vibrate.

The doctrine and laws of pendulums.—1. A pendulum raised to B, through the arc of the circle AB, will fall and rise again, through an equal arc, to a point equally high, as D: and thence will fall to A, and again rise to B; and thus continue rising and falling perpetually. For it is the same thing whether the body falls down the inside of the curve BAD, by the force of gravity, or is retained in it by the action of the string: for they will both have the same effect; and it is otherwise known, from the oblique descents of bodies, that the body will descend and ascend along the curve in the manner above described.

Experience also confirms this theory, in any finite number of oscillations. But if they are supposed infinitely continued, a difference will arise. For the resistance of the air, and the friction and rigidity of the string about the centre C, will take off part of the force acquired in falling; whence it happens that it will not rise precisely to the same point from whence it fell.

Thus, the ascent continually diminishing the oscillation, this will be at last stopped, and the pendulum will hang at rest in its natural direction, which is perpendicular to the horizon.

Now, as to the real time of oscillation in a circular arc BAD; it is demonstrated by mathematicians, that if $p = 3{\cdot}1416$, denote the circumference of a circle whose diameter is 1; $g = 16\frac{1}{12}$ feet, or 193 inches, the space a heavy body falls in the first second of time; and $r = $ CA, the length of the pendulum; also $a = $ AE, the height of the arch of vibration; then the time of each oscillation in the arc BAD, will be equal to $p\sqrt{\frac{r}{2g}}$ $\times$ the infinite series $1 + \frac{1^2 a}{2^2 d} + \frac{1^2.3^2 a^2}{2^2.4^2 d^2} + \frac{1^2.3^2.5^2 a^3}{2^2.4^2.6^2 d^3}$ &c. where $d = 2r$ is the diameter of the arc described, or twice the length of the pendulum.

And here, when the arc is a small one, as in the case of the vibrating pendulum of a clock, all the terms of this series after the 2d may be omitted, on account of their smallness; and then the time of a whole vibration will be nearly equal to $p\sqrt{\frac{r}{2g}}$ $\times \left(1 + \frac{a}{8r}\right)$. So that the times of vibration of a pendulum in different small arcs of the same circle, are as $8r + a$; or 8 times the radius, added to the versed sine of the semi-arc.

And farther, if D denotes the number of degrees in the semi-arc AB, whose versed sine is a, then the quantity last mentioned, for the time of a whole vibration, is changed to $p\sqrt{\frac{r}{2g}} \times \left(1 + \frac{D^2}{52524}\right)$. And therefore the times of vibration in different small arcs are as $52524 + D^2$, or as the number 52524 added to the square of the number of degrees in the semi-arc AB.

2. Let CB, fig. 2, pl. 132, be a semicycloid, having its base EC parallel to the horizon, and its vertex B downwards; and let CD be the other

half of the cycloid, in a similar position to the former. Suppose a pendulum-string of the same length with the curve of each semicycloid BC or CD, having its end fixed in C, and the thread applied all the way close to the cycloidal curve BC, and consequently the body or pendulum-weight coinciding with the point B. If now the body is let go from B, it will descend by its own gravity, and in descending it will unwind the string from off the arch BC, as at the position CGH; and the ball G will describe a semicycloid BHA, equal and similar to BGC, when it has arrived at the lowest point A; after which it will continue its motion, and ascend by another equal and similar semicycloid AKD, to the same height D, as it fell from at B, the string now wrapping itself upon the other arch CLD. From D it will descend again, and pass along the whole cycloid DAB, to the point B; and thus perform continual successive oscillations between B and D, in the curve of a cycloid; as it before oscillated in the curve of a circle, in the former case.

This contrivance to make the pendulum oscillate in the curve of a cycloid is the invention of the celebrated Huygens, to make the pendulum perform all its vibrations in equal times, whether the arch, or extent of the vibration, is great or small; which is not the case in a circle, where the larger arcs take a longer time to run through them than the smaller ones do, as is well known both from theory and practice.

The chief properties of the cycloidal pendulum then, as demonstrated by Huygens, are the following: 1st. That the time of an oscillation in all arcs, whether larger or smaller, is always the same quantity, *viz.* whether the body begins to descend from the point B, and describes the semiarch BA; or that it begins at H, and describes the arch HA; or that it sets out from any other point; as it will still descend to the lowest point A in exactly the same time. And it is farther proved, that the time of a whole vibration through any double arc BAD or HAK, &c. is in proportion to the time in which a heavy body will freely fall, by the force of gravity, through a space equal to $\frac{1}{2}$AC, half the length of the pendulum, as the circumference of a circle is to its diameter. So that, if $g = 16\frac{1}{12}$ feet denotes the space a heavy body falls in the first second of time, $p = 3.1416$ the circumference of a circle whose diameter is 1, and $r =$ AC the length of the pendulum; then, because by the nature of descents by gravity, $\sqrt{g} : \sqrt{\frac{1}{2}r} :: 1'' : \sqrt{\frac{r}{2g}}$, that is, the time in which a body will fall through $\frac{1}{2}r$, or half the length of the pendulum; therefore, by the above proportion, as $1 : p :: \sqrt{\frac{a}{2g}} : p\sqrt{\frac{r}{2g}}$, which is the time of an entire oscillation in the cycloid.

And this conclusion is abundantly confirmed by experience. For example: if we consider the time of a vibration as 1 second, to find the length of the pendulum that will so oscillate in 1 second; this will give the equation $p\sqrt{\frac{r}{2g}} = 1$; which reduced, gives $r = \frac{2g}{p^2} = \frac{386}{3.1416^2}$ inches $= 39.11$, or $39\frac{1}{8}$ inches, for the length of the second's pendulum; which the best experiments show to be about $39\frac{1}{8}$ inches.

3. Hence also, we have a method of determining, from the experimented length of a pendulum, the space a heavy body will fall perpendicularly through in a given time; for, since $p\sqrt{\frac{r}{2g}} = 1$, therefore, by reduction, $g = \frac{1}{2}p^2 r$ is the space a body will fall through in the first second of time, when r denotes the length of the second's pendulum; and as constant experience shows that this length is nearly $39\frac{1}{8}$ inches, in the latitude of London, in this case g, or $\frac{1}{2}p^2 r$, becomes $\frac{1}{2} \times 3.1416^2 \times 39\frac{1}{8} = 193.07$ inches $= 16\frac{1}{12}$ feet, very nearly, for the space a body will fall in the first second of time, in the latitude of London: a fact which has been abundantly confirmed by experiments made there. And in the same manner, Mr. Huygens found the same space fallen through at Paris to be 15 French feet.

The whole doctrine of pendulums oscillating between two semicycloids, both in theory and practice, was delivered by that author, in his Horologium Oscillatorium, sive Demonstrationes de Motu Pendulorum. And every thing that regards the motion of pendulums has since been demonstrated in different ways, and particularly by Newton, who has given an admirable theory on the subject, in his Principia, where he has extended to epicycloids the properties demonstrated by Huygens of the cycloids.

4. As the cycloid may be considered as coinciding in A, with any small arc of a circle described from the centre C, passing through A, where it is known the two curves have the same radius and curvature; therefore the time in the small arc of such a circle, will be nearly equal to the time in the cycloid; so that the times in very small circular arcs are equal, because these small arcs may be considered as portions of the cycloid, as well as of the circle. And this is one great reason why the pendulums of clocks are made to oscillate in as small arcs as possible, *viz.* that their oscillations may be the nearer to a constant equality.

This may also be deduced from a comparison of the times of vibration in the circle, and in the cycloid, as laid down in the foregoing articles. It has there been shown, that the times of vibration in the circle and cycloid are thus, *viz.* time in the circle nearly $p\sqrt{\frac{r}{2g}} \times (1 + \frac{a}{8r})$, time in the cycloidal arc $p\sqrt{\frac{r}{2g}}$; where it is evident that the former always exceeds the latter in the ratio of $1 + \frac{a}{8r}$ to 1; but this ratio always approaches nearer to an equality, as the arc, or as its versed sine a, is smaller; till at length, when it is very small, the term $\frac{a}{8r}$ may be omitted, and then the times of vibration become both the same quantity, viz. $p\sqrt{\frac{r}{2g}}$.

Farther, by the same comparison, it appears, that the time lost in each second, or in each vibration of the seconds pendulum, by vibrating in a circle, instead of a cycloid, is $\frac{a}{8r}$, or $\frac{D^2}{52524}$; and consequently the time lost in a whole day of 24 hours, is $\frac{5}{3}D^2$ nearly. In like manner, the seconds lost per day by vibrating in the arc of Δ degrees, is $\frac{5}{3}\Delta^2$. Therefore, if the pendulum keeps true time in one of these arcs, the seconds lost or gained per day, by vibrating

in the other, will be $\frac{1}{2}(D^2 - \Delta^2)$. So, for example, if a pendulum measures true time in an arc of 3 degrees, on each side of the lowest point, it will lose $11\frac{3}{4}$ seconds a day by vibrating 4 degrees; and $26\frac{3}{4}$ seconds a day by vibrating 5 degrees; and so on.

5. The action of gravity is less in those parts of the earth where the oscillations of the same pendulum are slower, and greater where these are swifter; for the time of oscillation is reciprocally proportional to $\sqrt{g}$. And it being found by experiment, that the oscillations of the same pendulum are slower near the equator, than in places farther from it; it follows that the force of gravity is less there; and consequently the parts about the equator are higher or farther from the centre, than the other parts; and the shape of the earth is not a true sphere, but somewhat like an oblate spheroid, flatted at the poles, and raised gradually towards the equator. And hence also the times of the vibration of the same pendulum, in different latitudes, afford a method of determining the true figure of the earth, and the proportion between its axis and the equatorial diameter.

Thus, M. Richer found by an experiment made in the island of Cayenne, about 4 degrees from the equator, that a pendulum 3 feet $8\frac{3}{5}$ lines long, which at Paris vibrated seconds, required to be shortened a line and a quarter to make it vibrate seconds. And many other observations have confirmed the same principle. See Newton's Principia, lib. iii. prop. 20. By comparing the different observations of the French astronomers, Newton apprehends that 2 lines may be considered as the length a second's pendulum ought to be decreased at the equator.

From some observations made by Mr. Campbell, in 1731, in Black-river, in Jamaica, 18° north latitude, it is collected, that if the length of a simple pendulum that swings seconds in London is 39.126 English inches, the length of one at the equator would be 39.02, and at the poles 39.197.

And hence Mr. Emerson has computed the following table, showing the length of a pendulum that swings seconds at every 5th degree of latitude.

Degrees of Latitude.	Length of Pendulum	Degrees of Latitude	Length of Pendulum.	Degrees of Latitude.	Length of Pendulum.
	Inches.		Inches.		Inches.
0	39.027	35	39.084	65	39.168
5	39 029	40	39.097	70	39.177
10	39.032	45	39.111	75	39 185
15	39.036	50	39.126	80	39.181
20*	39.044	55	39.142	85	39.195
25	39.057	60	39.158	90	39.197
30	39.070				

6. If two pendulums vibrate in similar arcs, the times of vibration are in the sub-duplicate ratio of their lengths. And the lengths of pendulums vibrating in similar arcs, are in the duplicate ratio of the times of a vibration directly; or in the reciprocal duplicate ratio of the number of oscillations made in any one and the same time.

For, the time of vibration t being as $p\sqrt{\frac{r}{2g}}$ where p and g are constant or given, therefore t is as $\sqrt{r}$, and r as t^2. Hence therefore the length of a half-second pendulum will be $\frac{1}{4}r$, or $\frac{39\frac{1}{8}}{4} =$ 9.781 inches; and the length of the quarter-second pendulum will be $\frac{1}{16}r = \frac{39\frac{1}{8}}{16} = 2.445$ inches; and so of others.

7. The foregoing laws, &c. of the motion of pendulums, cannot strictly hold good, unless the thread that sustains the ball is void of weight, and the gravity of the whole ball is collected into a point. In practice, therefore, a very fine thread, and a small ball, but of a very heavy matter, are to be used. But a thick thread, and a bulky ball, disturb the motion very much; for in that case, the simple pendulum becomes a compound one; it being much the same thing, as if several weights were applied to the same inflexible rod in several places.

8. Mr. Krafft, in the new Petersburgh Memoirs, vols. 6 and 7, has given the result of many experiments upon pendulums, made in different parts of Russia, with deductions from them, from whence he derives this theorem: if x is the length of a pendulum that swings seconds in any given latitude l, and in a temperature of 10 degrees of Reaumur's thermometer, then will the length of that pendulum, for that latitude, be thus expressed, *viz.*

$x = (439 \cdot 178 + 2 \cdot 321 + \sin.^2 l)$ lines of a French foot. And this expression agrees very nearly, not only with all the experiments made on the pendulum in Russia, but also with those of Mr. Graham, and those of Mr. Lyons in 79° 50′ north latitude, where he found its length to be 441·28 lines, and as well as the recent experiments and computations of the French philosophers.

Rule. To find the length of a pendulum to make any number of vibrations, and *vice versa*. Call the pendulum making 60 vibrations the standard length; then say, as the square of the given number of vibrations is to the square of 60; so is the length of the standard to the length sought. If the length of the pendulum be given, and the number of vibrations it makes in a minute be required; say, as the given length is to the standard length, so is the square of 60, its vibrations in a minute, to the square of the number required. The square root of which will be the number of vibrations made in a minute.

From this rule it is easy to find that a pendulum 52·02982 inches long, will vibrate as often in a minute, as it is inches in length.

One that is 3·394805 inches long, will vibrate as often in a second, as it is inches in length.

Angular pendulum, is formed of two pieces or legs like a sector, and is suspended by the angular point. This pendulum was invented with a view to diminish the length of the common pendulum, but at the same time to preserve or even increase the time of vibration. In this pendulum, the time of vibration depends on the length of the legs, and on the angle contained between them conjointly, the duration of the time of vibration increasing with the angle. Hence a pendulum of this construction may be made to oscillate in any given time. At the lower extremity of each leg of the pendulum is a ball or bob as usual. It may be easily shown, that in this kind of pendulum, the squares of the times of vibration are as the secants of half the angle contained by the legs: hence, if a pendulum of this construction vibrates half seconds when its legs are close, it will vibrate whole seconds when the legs are opened, so as to contain an angle equal to 151° 2½′.

If the two cylindrical legs of an angular pendulum are each 15 inches, and they make an angle of 150° 23′, the time of vibration will be 1 second; if the angle be increased to 178° 4′ $\frac{1}{2}$′ while the legs continue of the same length, the time of vibration would be 5 seconds. (*Gregory's Mechanics*, vol. i. p. 269.)

If an isosceles right angled triangle be suspended at its vertex, the centre of oscillation will be in the middle of its base; and if a right angled cone be suspended at its vertex, the centre of oscillation will be in the centre of the base: in either case, therefore, the time of vibration will be the same as that of a simple pendulum whose length is equal to the altitude of the triangle or of the cone. Other pendulums whose lengths shall be equal to the distance between the point of suspension and the centre of oscillation, may be readily found from the known expressions for the centre of oscillation. Thus, in a parabola vibrating in its own plane and suspended at its vertex, the distance of the centre of oscillation from that vertex is $\frac{5}{7}$ axis + $\frac{1}{3}$ parameter: and when this expression is equal to the axis, the base of the parabola will be to its axis, as 1·85164 to 1.

The conical or circular pendulum, is so called from the figure described by the string or ball of the pendulum. This pendulum was invented by Mr. Huygens, and is also claimed by Dr. Hook.

In order to understand the principles of this pendulum, it will be necessary to premise the following lemma, *viz.* The times of all the circular revolutions of a heavy globular body, revolving within an inverted hollow paraboloid, will be equal, whatever be the radii of the circles described by that body.

In order, therefore, to construct the pendulum so that its ball may always describe its revolutions in a paraboloid surface, it will be necessary that the rod of the pendulum be flexible, and that it be suspended in such a manner as to form the evolute of the given parabola. Hence, let KH (fig. 3, pl. 132) be an axis perpendicular to the horizon, having a pinion at K moved by the last wheel in the train of the clock; and a hardened steel point at H moving in an agate pivot, to render the motion as free as possible. Now, let it be required that the pendulum shall perform each revolution in a second, then the paraboloid surface it moves in must be such whose *latus rectum* is double the length of the common half-second pendulum. Let O be the focus of the parabola MEC, and MC the *latus rectum*; and make AE = MO = $\frac{1}{2}$MC = the length of a common half-second pendulum. At the point A of the verge, let a thin plate AB be fixed at one end, and at the other end B let it be fastened to a bar or arm BD perpendicular to DH, and to which it is fixed at the point D. The figure of the plate AB is that of the evolute of the given parabola MEC.

The equation of this evolute, being also that of the semicubical parabola, is $\frac{27}{16}px^2 = y^3$.—Let $\frac{27}{16}p = P$; then $Px^2 = y^3$, and in the focus $P = 2y$. In this case $2x^2 = y^2 = \frac{1}{4}P^2$: hence $x^2 = \frac{1}{8}P^2$, and $x = P\sqrt{\frac{1}{8}} = \frac{27}{16}p\sqrt{\frac{1}{8}}$ = the distance of the focus from the vertex A. By assuming the value of x, the ordinates of the curve may be found; and hence it may be easily drawn.

The string of the pendulum must be of such a length, that when one end is fixed at B, it may lie over the plate AB, and then hang perpendicular from it, so that the centre of the bob may be at E when at rest. Now the verge K— being put into motion, the ball of the pendulum will begin to gyrate, and thereby conceive a centrifugal force which will carry it out from the axis to some point F, where it will circulate seconds or half seconds according as the line AE is 9.8 inches, or 2$\frac{1}{4}$ inches, and AB answerable to it.

One advantage possessed by a clock having a pendulum of this construction is that the second hand moves in a regular and uniform manner, without being subject to those jerks or starts as in common clocks; and the pendulum is entirely silent.

The conical pendulum has been very ingeniously employed as a regulator by Messrs. Boulton and Watt, in their steam engines. See Steam engine.

The greatest inconvenience attending the pendulum is, that it is constantly liable to an alteration of its length, from the effects of heat and cold, which very sensibly expand and contract all metalline bodies. See Heat. Pyrometer, &c.

To remedy this inconvenience, the common method is by applying the bob of the pendulum with a screw; so that it may be at any time made longer or shorter, according as the bob is screwed downwards or upwards, and thereby the time of its vibrations kept always the same. Again, if a glass or metalline tube, uniform throughout, filled with quicksilver, and 58.8 inches long, were applied to a clock, it would vibrate seconds for 39.2 = $\frac{2}{3}$ of 58.8, and such a pendulum admits of a twofold expansion and contraction, *viz.* one of the metal and the other of the mercury, and these will be at the same time contrary, and therefore will correct each other. For by what we have shown, the metal will extend in length with heat, and so the pendulum will vibrate slower on that account. The mercury also will expand with heat, and since by this expansion it must extend the length of the column upward, and consequently raise the centre of oscillation; so that by this means its distance from the point of suspension will be shortened, and therefore the pendulum on this account will vibrate quicker; wherefore, if the circumstances of the tube and mercury are skilfully adjusted, the time of the clock might, by this means, for a long course of time, continue the same, without any sensible gain or loss. This was the invention of Mr. Graham, in the year 1721, who made a clock of this sort, and compared it with one of the best of the common sort for three years together, and found the errors of the former but about one-eighth part of the latter.

Mr. Graham also made a pendulum consisting of three bars, one of steel between two of brass, and the steel bar acted upon a lever, so as to raise the pendulum, when lengthened by heat, and to let it down, when shortened by cold; but he found this clock liable to sudden starts and jerks in its motion.

The ingenious Mr. Ellicott, in the Transactions of the Royal Society, describes a pendulum of his invention, composed of brass and iron, with the method of applying it, so as to avoid the many jerks to which the machine might be liable.

But besides the irregularities arising from heat and cold, pendulum clocks are liable to others from friction and foulness; to obviate which, Mr. Harrison has several excellent contrivances,

whereby his clocks are almost entirely free from friction, and never need to be cleaned.

The gridiron pendulum is a contrivance for the same purpose. Instead of one rod, this pendulum is composed of any convenient odd number of rods, as five, seven, or nine; being so connected, that the effect of one set of them counteracts that of the other set; and therefore, if they are properly adjusted to each other, the centres of suspension and oscillation will always be equidistant. Fig. 4 represents a gridiron pendulum composed of nine rods, steel and brass alternately. The two outer rods, AB, CD, which are of steel, are fastened to the cross pieces AC, BD, by means of pins. The next two rods, EF, GH, are of brass, and are fastened to the lower bar BD, and to the second upper bar EG. The two following rods are of steel, and are fastened to the cross bars EG and IK. The two rods adjacent to the central rod being of brass, are fastened to the cross pieces IK and LM; and the central rod, to which the ball of the pendulum is attached, is suspended from the cross piece LM, and passes freely through a perforation in each of the cross bars IK, BD. From this disposition of the rods, it is evident that, by the expansion of the extreme rods, the cross piece BD, and the two rods attached to it, will descend: but since these rods are expanded by the same heat, the cross piece EG will consequently be raised, and therefore also the two next rods; but because these rods are also expanded, the cross bar IK will descend; and by the expansion of the two next rods, the piece LM will be raised a quantity sufficient to counteract the expansion of the central rod. Whence it is obvious, that the effect of the steel rods is to increase the length of the pendulum in hot weather, and to diminish it in cold weather, and that the brass rods have a contrary effect upon the pendulum. The effect of the brass rods must, however, be equivalent not only to that of the steel rods, but also to the part above the frame and spring, which connects it with the cock, and to that part between the lower part of the frame and the centre of the ball.

Another excellent contrivance for the same purpose is described in a French author on clock-making. It was used in the north of England by an ingenious artist about fifty years ago. This invention is as follows: a bar of the same metal with the rod of the pendulum, and of the same dimensions, is placed against the back-part of the clock-case: from the top of this a part projects, to which the upper part of the pendulum is connected by two fine pliable chains or silken strings, which just below pass between two plates of brass, whose lower edges will always terminate the length of the pendulum at the upper end. These plates are supported on a pedestal fixed to the back of the case. The bar rests upon an immoveable base at the lower part of the case; and is inserted into a groove, by which means it is always retained in the same position. From this construction, it is evident that the extension or contraction of this bar, and of the rod of the pendulum, will be equal, and in contrary directions. For suppose the rod of the pendulum to be expanded any given quantity by heat; then, as the lower end of the bar rests upon a fixed point, the bar will be expanded upwards, and raise the upper end of the pendulum just as much as its length was increased; and hence its length below the plates will be the same as before.

It has been supposed by several, that the tubular pendulum (which is also a modification of Harrison's compensation) is but a very recent invention: but the writer of the article Clock in the British Encyclopædia met with one by accident which was made upwards of thirty years ago; and thinks it but justice, both to the public and the ingenious artist who directed its construction, to oppose this opinion. This pendulum is in possession of Mr. Patoureaux, watch and clock-maker, 15, Wardour-street. It was made by Mr. William Brown, a clock-maker well known to the trade, who has been dead upwards of five years, and who formerly resided near the Seven Dials. His brother, a jeweller, residing in 15, Coventry-court, Haymarket, was his executor, and sold the pendulum to Mr. Barrett, clock-maker, of Compton-street, some years ago, from whence Mr. Patoureaux bought it. Mr. Brown, the jeweller, informed the writer that this pendulum had been made by his brother upwards of thirty years ago, just after he had served his time to Mr. Chandler, then of King-street, Seven Dials (whom he afterwards succeeded in his business); and that it was made by direction of Mr. Chandler, who, as far as he knew, was the inventor of it: and in corroboration of this assertion, Mr. Hampson, working clock-maker, 22, Greek-street, Soho, declares, that he made several pendulums of the same construction for Mr. Brown, upwards of seven years ago. This tubular pendulum, which at present we must attribute to the ingenuity of Mr. Chandler, is composed of two tubes and a rod of iron, and two tubes of brass. The iron rod is about a quarter of an inch in diameter, and is suspended by a spring in the common manner: it is inclosed by the first brass tube, to which it is connected at bottom: an iron tube, supported by the top of the brass tube, then descends a little below it, and supports by its lower extremity the second brass tube, which rises a little above the former tubes, and from the top of it the second iron tube descends below all about two inches into the substance of the pendulum bob, which is very large and heavy: the bottom of this last tube contains a nut, into which a screw (having a milled head beneath that sustains the bob), passes from below, and raises or lowers the bob, as required for the adjustment of the rate of going of the clock. We may date the invention of the tubular pendulum, from the foregoing information, about the year 1775, though it may yet be found to be of a still earlier period. The foreman of Mr. Villaumy, clock-maker to the Prince of Wales, Pall-mall, declares, that he remembers a tubular pendulum to have been made by Mr. Finney, a well-known clock-maker of Liverpool, upwards of forty years ago, and that it is now in the possession of Mr. De Membry, of Richmond; but space will not permit the farther investigation of this point at present.

The modification of the longitudinal compensation made public by Mr. Troughton, mathematical instrument-maker, differs from Chandler's tubular pendulum, in having but two tubes of brass, which afford the ascending compensations, while the descending ones are performed by five wires of steel. The order of brass and steel is the same as in Chandler's pendulum; but all the steel wires pass downwards through the internal brass tube. The last pair of wires connect the whole with the bob by a short cylindrical piece of brass, to which the bob is suspended by its centre.

Mr. Troughton made this pendulum in July,

1804, and published the first account of it in December same year, in Nicholson's Philosophical Journal: we believe he knew nothing of the priority of Chandler's tubular pendulum to his, and that in thinking and declaring himself the first inventor of tubular pendulums, he only fell into an error common to many other ingenious men on similar occasions; and this error is the more excusable, as at the time Chandler made his pendulum there were no periodical works in existence which professedly recorded the improvements of arts and manufactures, and artists were in general more careful to conceal their discoveries than to acquire reputation by making them public.

Before concluding the enumeration of various sorts of pendulums, one suggested by Mr. Troughton should be noticed, which seems worthy of trial. He proposes that its rod should be made of baked potter's earth, of the same composition as Wedgewood's thermometer, and furnished with a metallic cap, by which it should be sustained by the knife-edge suspension, which the celebrated Berthoud affirms has less friction than the spring suspension.

The chief advantages which tubular pendulums have over those of the gridiron construction are, that they admit of being much lighter above the bob with equal strength; that they experience less resistance from the air in their vibrations; and that they are less liable to those shakes and irregular motions in their expansions which the others experience: on the other hand, as the outside tube alone in them comes in contact with the air through which it passes in its vibrations, the inner tube can receive much less of its influence as to temperature, which arises from this motion, and which Cummings has shown to be of considerable consequence. In Troughton's pendulum the great difference of the masses of matter between the ascending and descending parts must be another source of error, as the small wires of which the latter consist indubitably will much sooner experience the influence of a change of temperature in the air than the more bulky substance of the tubes. In this latter respect Chandler's tubular pendulum seems superior to Troughton's, all its parts being much more nearly of the same magnitude.

The last compensation pendulum we shall mention is that of Mr. Adam Reid, a very ingenious mechanist at Woolwich. It is made of steel and zinc, the proportions of the respective parts being adjusted according to their several powers of expansion. The following are Mr. Reid's directions. Procure a rod of forged blister-steel 52.7 inches long, ·27 diameter, heat it to a white heat, which will open the pores of the steel, and give it the smallest expansive power that steel of that texture is possessed of; when cold, straighten it with a mallet of wood on a wooden block, that no part may be condensed partially, which would be the case if a hammer and anvil were used. Then cast a solid rod of zinc 12·5 inches long, ·68 diameter, with the lowest heat that will fuse it; pour it into a metal mould: this will give it the greatest density, consequently the greatest expansion that zinc is possessed of. Then bore a hole through the centre of it longitudinally, that it may move freely at the steel rod, which has a nut and screw at the bottom end to regulate the clock to mean time; the bob, as shown in fig. 5, plate 132, rests on the upper end of the cylinder of zinc, and will continue in the same place, whatever expansion or contraction takes place, if the adjustment be correct.

If platina were used instead of steel, and steel instead of zinc, a pendulum might be made equally good, and more compact; but not at so small an expence. The dimensions above specified are for a second's pendulum in its finished state.

To give all possible perspicuity to this description, figs. 5 and 6, pl 132, are added: where AB represents the steel rod extending through the whole. C the bob, supported upon the compensating cylinder of zinc D, which surrounds the rod AB, and rests upon the nut E of a screw tapped upon the end of the steel rod, to bring it to exact time; as this expands downwards by heat, the zinc expands upwards the same quantity; so that the bob always remains at the same distance from the point of suspension. Fig. 6 is a section to show more clearly the thickness of the zinc tube D, and the form of the steel rod at *a*, where it passes through the bob, it being there of the transverse shape shown at L, that the rod or the bob may not turn round when the nut E is turned to adjust it to time.

Fifteen guineas were voted to Mr. Reid by the society, as a compliment for this truly ingenious invention.

Pendulum-clock is a clock having its motion regulated by the vibration of a pendulum.

It is controverted between Galileo and Huygens, which of the two first applied the pendulum to a clock.

After Huygens had discovered that the vibration made in arcs of a cycloid, however unequal they might be in extent, were all equal in time; he soon perceived, that a pendulum applied to a clock, so as to make it describe arcs of a cycloid, would rectify the otherwise unavoidable irregularities of the motion of the clock; since, though the several causes of those irregularities should occasion the pendulum to make greater or smaller vibrations, yet, by virtue of the cycloid, it would still make them perfectly equal in point of time; and the motion of the clock governed by it would therefore be preserved perfectly equable. But the difficulty was, how to make the pendulum describe arcs of a cycloid; for naturally the pendulum, being tied to a fixed point, can only describe circular arcs about it.

Here Mr. Huygens contrived to fix the iron rod or wire, which bears the ball or weight at the top, to a silken thread, placed between two cycloidal cheeks, or two little arcs of a cycloid, made of metal. Hence the motion of vibration, applying successively from one of those arcs to the other, the thread, which is extremely flexible, easily assumes the figure of them, and by that means causes the ball or weight at the bottom to describe a just cycloidal arc.

This is doubtless an ingenious invention, more especially as it gave rise to the whole doctrine of involute and evolute curves, with the radius and degree of curvature, &c.

But it is not of any essential service in the practice of clock-making; for the isochronism of vibrations in cycloidal arcs is demonstrated upon the supposition that the whole mass of the pendulum is concentrated in a point: a supposition which cannot actually take place in any vibrating body. Many other reasons have induced the artists to abandon the use of the cycloidal pendulum. The principal are, the difficulty with which the metallic cheeks are bent into the true cycloidal

form; the improbability of their long retaining it, supposing it once given; and the changes of which the pendulum is susceptible in consequence of the expansion and contraction by heat and cold. These sources of error are such as the peculiar property of the cycloid cannot obviate: and as the variations from isochronism in very small circular arcs is extremely trifling, the cycloidal pendulum is now wholly disused in practice (*Gregory's Mechanics*, vol. i. p. 230.)

PENELOPE, in fabulous history, a celebrated princess of Greece, daughter of Icarius, of Sparta, and wife of Ulysses, king of Ithaca. She soon after became mother of Telemachus, and was obliged to part with great reluctance from her husband, whom the Greeks obliged to go to the Trojan war. (Vid. PALAMEDES.) The continuation of the war rendered her melancholy; but when Ulysses did not return, like the other princes, her fears were increased, and she was soon beset by a number of suitors, who wished her to believe that her husband was shipwrecked. She received their addresses with disdain; she yet flattered them with hopes, and declared that she would make choice of one of them, as soon as she had finished a piece of tapestry then in hand; but she baffled their eager expectations by undoing in the night what she had done in the day-time. This artifice of Penelope has given rise to the proverb of *Penelope's web*, which is applied to whatever labour can never be ended. The return of Ulysses, after an absence of twenty years, however, delivered her from her dangerous suitors. (*Homer, Ovid*, &c.) Penelope is described by Homer as a model of female virtue and chastity; but some more modern writers dispute her claims to modesty and continence, representing her as the most debauched and voluptuous of her sex.

PENELOPE, in zoology, a genus of the class aves, order gallinæ. Bill naked at the base; head covered with feathers; chin naked; tail with twelve feathers; legs spurless. Four species; in Linnéus six; two of which last, however, do not properly belong to this genus.

1. P. cristata Guan. Head with an erect crest; temples violet; bill black; irids orange; nostrils reaching from the middle of the bill to the front; orbits violet; caruncle on the chin compressed, red, covered with a few hairs; crest oblong; body black-green; back brown; neck, breast, and belly spotted with white; legs red. Inhabits Brazil and Guiana; two and a half feet long. They are often tamed; and make a noise not unlike the sound *jacu*: flesh accounted good.

2. P. cumanensis. Yacou. Blackish; crest and first quill-feathers white; irids brownish; orbits and chin naked, blueish; body beneath speckled with white; tail long, even; legs red. Inhabits Cayenne and Guiana; size of a hen-turkey; erects the crest and spreads its tail; builds on the ground, or in low trees. At Cayenne it is tamed, becomes familiar, and will mix with other poultry.

3. P. pipile. Piping curassow. Caruncle on the chin blue; belly black; back brown, spotted with black; wing-coverts and first quill-feathers white; legs red. Inhabits with the last: voice weak, piping.

4. P. maril. Marail. Greenish-black; naked orbits, and legs red; throat nakedish, speckled with white; bill and irids blackish; head crested. The crest erected when the bird is irritated; wings short; tail long, even, often erected and expanded. Inhabits in flocks in the woods of Guiana; roosts in trees whose food it feeds upon; emits a disagreeably harsh cry.

PENETRABI'LITY. *s.* (from *penetrable.*) Susceptibility of impression from another body (*Cheyne*).

PE'NETRABLE. *a.* (*penetrable*, Fr. *penetrabilis*, Latin.) 1. Such as may be pierced; such as may admit the entrance of another body (*Dryden*). 2. Susceptive of moral or intellectual impression (*Shakspeare*).

PE'NETRAIL. *s.* (*penetralia*, Latin.) Interior parts: not in use (*Harvey*).

PE'NETRANCY. *s.* (from *penetrant.*) Power of entering or piercing (*Ray*).

PE'NETRANT. *a.* (*penetrant*, French.) Having the power to pierce or enter; sharp; subtile (*Boyle*).

To PE'NETRATE. *v. a.* (*penetrer*, Fr.) 1. To pierce; to enter beyond the surface; to make way into a body (*Arbuthnot*). 2. To affect the mind. 3. To teach the meaning (*Ray*).

To PE'NETRATE. *v. n.* 1. To make way (*Pope*). 2. To make way by the mind (*Locke*).

PENETRA'TION. *s.* (*penetration*, Fr.) 1. The act of entering into any body (*Milton*). 2. Mental entrance into any thing abstruse. 3. Acuteness; sagacity (*Watts*).

PE'NETRATIVE. *a.* (from *penetrate.*) 1. Piercing; sharp; subtile (*Wotton*). 2. Acute; sagacious; discerning (*Swift*). 3. Having the power to impress the mind (*Shakspeare*).

PE'NETRATIVENESS. *s.* (from *penetrative.*) The quality of being penetrative.

PENGUIN, in ornithology. See ALCA and APTENODYTES.

PENGUIN, in botany. See BROMELIA.

PENICILLIFORM APPENDIX. In botany, an appendix to the keel of the corol in some sorts of polygala; in shape of a painter's pencil.

PENICILLIFORM STIGMA. A pencil-shaped stigma; as in milium.

PENICILLUM, in anatomy. See ACINI BILIOSI.

PENI'NSULA. *s.* (Latin, *pene insula.*) A piece of land almost surrounded by the sea.

PENI'NSULATED. *a.* (from *peninsula.*) Almost surrounded by water.

PENIS. (*penis, a pendendo*, from its hanging down.) Membrum virile. The cylindrical part that hangs down under the mons veneris before the scrotum of males. It is divided by anatomists into the root, body, and

head, called the glans penis. It is composed of common integuments, two corpora cavernosa, and one corpus spongiosum, which surrounds a canal, the urethra, that proceeds from the bladder to the apex of the penis, where it opens by the meatus urinarius. (See URETHRA.) The fold of the skin that covers the glans penis is termed the prepuce. The arteries of the penis are from the hypogastric and ischiatic. The vein of the penis, vena magna ipsius penis, empties itself in the hypogastric vein. The absorbents of this organ are very numerous, and run under the common integuments to the inguinal glands: absorbents also are found in great plenty in the urethra. The glands of the penis are, Cowper's glands, the prostate, muciparous, and odoriferous glands. The nerves of the penis are branches of the sacral and ischiatic.

PENIS ERECTOR. In myology. See ERECTOR PENIS.

PENISCOLA, a town of Spain, in Valencia, seated on a high point of land, surrounded on three sides by the sea, and of difficult access by land. It is 30 miles S. by W. of Tortosa, and 80 N.N.E. of Valencia. Lon. 0. 24 E. Lat. 40. 24 N.

PENISHEHR, a town of Candahar, in the country of Cabul, 46 miles N. of Cabul.

PE'NITENCE. *s.* (*penitence*, Fr. *pœnitentia*, Latin.) Repentance; sorrow for crimes; contrition for sin, with amendment of life or change of the affections (*Dryden*).

PE'NITENT. *a.* (*penitent*, Fr. *penitens*, Lat.) Repentant; contrite for sin; sorrowful for past transgressions, and resolutely amending life (*Milton*).

PE'NITENT. *s.* 1. One sorrowful for sin (*Rogers*). 2. One under censures of the church, but admitted to penance (*Stillingfleet*). 3. One under the direction of a confessor.

PENITE'NTIAL. *a.* (from *penitence*.) Expressing penitence; enjoined as penance (*Shakspeare*).

PENITE'NTIAL. *s.* (*penitenciel*, Fr. *pœnitentiale*, low Latin.) A book directing the degrees of penance (*Ayliffe*).

PENITENTIARY, in the ancient Christian church, a name given to certain presbyters or priests, appointed in every church to receive the private confessions of the people, in order to facilitate public discipline, by acquainting them what sins were to be expiated by public penance, and to appoint private penance for such private crimes as were not proper to be publicly censured.

PENITENTIARY, at the court of Rome, is an office in which are examined and delivered out the secret bulls, graces, or dispensations relating to cases of conscience, confessions, &c.

PENITENTIARY, is also an officer, in some cathedrals, vested with power from the bishop to absolve, in cases reserved to him. The pope has at present his grand penitentiary, who is a cardinal, and the chief of the other penitentiary-priests established in the church of Rome, who consult him in all difficult cases. He presides in the penitentiary, dispatches dispensations, absolutions, &c. and has under him a regent and 24 proctors, or advocates of the sacred penitentiary.

PE'NITENTLY. *ad.* (from *penitent*.) With repentance; with sorrow for sin; with contrition.

PE'NKNIFE. *s.* (*pen* and *knife*.) A knife used to cut pens (*Bacon*).

PENKRIDGE, a town in Staffordshire, with a market on Tuesday, seated on the river Penk, six miles S. of Stafford, and 129 N.W. of London.

PENKUM, a town of Hither Pomerania, seated on a lake, 15 miles S.W. of Stettin.

PENMAENMAWR, a mountain of Wales, in Carnarvonshire, overhanging the sea. It is four miles W. by S. of Aberconway; and the road to Holyhead crosses it on the side of a dreadful precipice, from which it is defended by a wall. The mountain is 1540 feet above the level of the sea.

PE'NMAN. *s.* (*pen* and *man*.) 1. One who professes the art of writing. 2. An author; a writer (*Addison*).

PE'NMANSHIP. *s.* Writing; that which is effected by the pen.

PENN (William), an English admiral, born at Bristol, in 1621. He commanded with Venables at the taking of Jamaica from the Spaniards, in 1655, and the same year was elected member of parliament for Weymouth. He was committed to the tower by Cromwell, for quitting his command without leave, but was soon released. He was chief commander under the duke of York, in the signal and successful battle with the Dutch fleet, in 1664, and was honoured with knighthood. He died in retirement at Wanstead, in Essex, in 1670.

PENN (William), an eminent quaker and writer, son of the above, was born in the parish of St. Catherine's, near the tower, in 1644. He was put to school, first at Chigwell, in Essex, then to a master on Tower-hill, and lastly under the care of a private tutor. One Thomas Loe, a quaker, is said to have confirmed him in his design of uniting with that sect. He was, with many other persons, taken out of a meeting-house at Cork, and imprisoned; and this unjust persecution on a people for opinion's sake strenghtened his affection and ties of union with them. His father, though offended with his son, obtained his release. He was, however, afterwards sent to the tower for a book he had written, and during the seven months he was confined he wrote his famous No Cross, no Crown. He was so courageous and able a champion in the cause of his oppressed brethren, as to obtain an order for the release of all in prison. In the next year the conventicle act occasioned his being imprisoned a third time. He was also tried at the Old Bailey for preaching to a seditious assembly. He pleaded his own cause and was acquitted, but the jury were fined, and he

was detained in prison. He obtained his own and their release, probably by the interest of his father, for the quakers deem the payment of a fine an acknowledgment of guilt. His father became perfectly reconciled to him before his death, which happened in 1670, for he said to him, "Son William, let nothing in this world tempt you to wrong your conscience: I charge you do nothing against your conscience. So will you keep peace at home, which will be a feast to you in a day of trouble." He had a controversy with Muggleton, the founder of a sect; and held, near Rickmansworth, a public dispute with the no less famous Richard Baxter. He lived many years at Werminghurst, in Sussex, an estate which he had by his wife Gulielma Maria Springett, whose father had been killed at the siege of Bamber, in the civil wars. From this residence, he went, in company with George Fox and Robert Barclay, on a mission to Holland and Germany. In 1681 king Charles granted him, in lieu of arrears due to his father, the province in North America, till then called the New Netherlands, but since Pennsylvania. Mr. Penn's friendly and pacific manner of treating the Indians produced in them an extraordinary love for him and his people; so that they have maintained a perfect amity with the English in Pennsylvania ever since. He died in 1718, at Jordans, near Beaconsfield, of the effects of three apoplectic fits. He left considerable property behind him, having inherited 1500l. a year from his father.

At one period of his life, Penn lodged in a house in Norfolk-street in the Strand. In the entrance to it he had a peeping-hole, through which he could see any person that came to him. A creditor one day sent in his name; and having been made to wait more than a reasonable time, he knocked for the servant, whom he asked, "Will not thy master see me?" "Friend, (answered the servant) he has seen thee, but he does not like thee."

He was the greatest bulwark of the Quakers; in whose defence he wrote numberless pieces. Besides the above works, he wrote a great number of others; the most esteemed of which are, 1. His Primitive Christianity revived. 2. His defence of a paper entitled Gospel Truths, against the Exceptions of the bishop of Cork. 3. His Persuasive to Moderation. 4. His Good Advice to the Church of England, Roman Catholic, and Protestant Dissenter. 5. The sandy Foundation shaken. 6. No Cross, no Crown. 7. The great Case of Liberty of Conscience debated. 8. The Christian Quaker and his Testimony stated and vindicated. 9. A Discourse of the general Rule of Faith and Practice, and Judge of Controversy. 10. England's present Interest considered. 11. An Address to Protestants. 12. His Reflections and Maxims. 13. His Advice to his Children. 14. His Rise and Progress of the People called Quakers. 15. A Treatise on Oaths. Most of these have passed several editions, some of them many. The letters between William Penn and Dr. Tillotson, and William Penn and William Popple, esq. together with Penn's letters to the princess Elizabeth of the Rhine, and the countess of Hornes, as also one to his wife on his going to Pennsylvania, are inserted in his works, which were first collected and published in 2 vols. folio; and the parts since selected and abridged into 1 vol. folio, are very much and deservedly admired for the good sense they contain.

PE'NNACHED. *a.* (*pennache*, Fr.) Applied to flowers when the ground of the natural colour of their leaves is radiated and diversified neatly without any confusion (*Trevoux*).

PE'NNANT. *s.* (*pennon*, Fr.) 1. A small flag, ensign, or colour. 2. A tackle for hoisting things on board.

PENNANT (Thomas), an able naturalist and antiquary, born at Downing, Flintshire, 1726, and educated at Wrexham school, and Oxford. After examining whatever was curious and valuable in England, he travelled on the continent, and was introduced to the learned of Europe, especially Buffon, Voltaire, Linnéus, &c. On his return he commenced author, and from 1750, when his British zoology appeared, to the time of his death, he employed himself in elucidating the history, geography, and natural curiosities of his country. He died at Downing, 1798. His works are numerous, the best known are tour in Scotland, 1771, often edited—tours in Wales, from Chester to London—account of London—literary memoirs of himself—a geographical account of India, &c.

PENNANTIA, in botany, a genus of the class polygamia, order dioecia. Calyxless; corol five-petalled; stamens five; stigma flat, peltate, pericarp three-sided, two-celled; seeds solitary. One species, a native of New Zealand.

PENNAR, a river of Hindustan, which rises in Mysore, flows by Gooty, Gandicotta, Cuddapah, and Vellore, and enters the Bay of Bengal, at Gangapatnam.

PENNATA FOLIA, winged leaves, among botanists, are such leaves of plants as grow directly one against another, on the same rib or stalk: as those of ash, walnut tree, &c.

PENNATED. *a.* Winged.

PENNATULA. Sea-pen. In zoology, a genus of the class vermes, order zoophyta. Animal not affixed, of various shapes, supported by a bony part within, naked at the base, the upper part with generally lateral ramifications furnished with rows of tubular denticles, producing radiate polypes from each tube. Eighteen species, scattered through the seas of the globe.

This worm is not a coralline, or alcyony, as being unaffixed to any other substance, but in other respects it much resembles these tribes. Its figure is that of a quill-feather of a bird's wing; it is usually about four inches long, and of a red colour; along the back there is a groove from the extremity of the feathered

part, as there is in a pen; the feathered part consists of fins proceeding from the stem; these fins move the animal backward and forward in the water, and are furnished with suckers or mouths armed with filaments. The following are the chief species.

1. P. coccinea. Stem round, radiating, with papillous, polype-bearing sides, and clavate at the top. Inhabits the deeps of the White Sea, and unites the two genera of alcyonium and pennatula: soft, red, an inch and half high; and as thick as the little finger, wrinkled, with the papillæ disposed in rows.

2. P. phosphorea. Stem fleshy; with a rough midrib, and imbricated ramifications. Inhabits most seas, and found in those of our own country; emits a very strong phosphoric light in the dark; about four inches long, red; stem villous; rays nearly incumbent, and all pointing one way.

3. P. encrinus. Stem quadrangular, taper, very long, bony, covered with a callous membrane, with an umbellate cluster of polypes from the top. Inhabits the Greenland seas; above six feet long; and when taken fresh from the sea appears like a nosegay of yellow flowers; upper part of umbel composed of from twenty to thirty cylindrical polypes, each with eight claws at the tip, and seated on a long pedicle.

PENNER. s. (from *pen.*) 1. Writer. 2. A pencase (*Ainsworth*).

PENNICUIK (Alexander), a Scotch physician. He published a topographical account of Tweedale, some poems, descriptive of the manners of his countrymen, &c. He died 1722, aged 70. It is said that he communicated to Allan Ramsay the incidents which form the subject of his Gentle Shepherd.

PENNILESS. *a.* (from *penny.*) Moneyless; poor; wanting money.

PENNON. *s.* (*pennon*, Fr.) A small flag or colour (*Shakspeare*).

PENNSYLVANIA, one of the United States of America, 288 miles long and 156 broad; bounded on the N. by New York, E. by that province and New Jersey, S. by Delaware, Maryland, and Virginia, W. by the latter and that of Ohio, and N.W. by Lake Erie, on which it has a considerable front, and a good port. It is divided into 23 counties; viz. Philadelphia, Chester, Delaware, Bucks, Montgomery, Berks, Lancaster, Dauphin, Northampton, Luzerne, York, Cumberland, Northumberland, Franklin, Bedford, Huntingdon, Mifflin, Westmorland, Somerset, Fayette, Washington, Allegany, and Lycoming. It is well watered by the Delaware, Schuylkill, Susquehanna, Monongahela, Allegany, and other navigable rivers. Its produce is corn, cattle, potash, wax, skins, and furs; and the principal manufactures are iron, copper, tin, leather, paper, gunpowder, hats, cotton, sugar, and tobacco. Philadelphia is the capital.

This country was granted to the famous William Penn, son of sir William Penn, admiral of the English fleet, in the time of Oliver Cromwell and Charles II. Sir William, as some reward for his services, and in consideration of sundry debts due to him from the crown, was promised a grant of this country from king Charles II, but died before he obtained it. His son did not for some time apply himself strenuously to solicit the grant promised to his father; but at length finding his friends, the Quakers, were harassed in every part of England by spiritual courts, he renewed his application to the court, and having obtained his grant, went into America, and purchased the soil at a very low rate of the Indians, its original possessors. By this cheap act of justice at the beginning, he rendered all his future dealings the more easy, the Indians having conceived very favourable opinions both of him and his designs. Having thus succeeded in the first part of his plan, he proceeded to the other, namely, to people the country he had thus obtained. And this was greatly facilitated by the uneasiness of the English quakers; who, from their high opinion of the man, determined to follow him over the vast Atlantic Ocean, to a country uncultivated, and a climate strange and unknown. Nor was he himself wanting in any thing that had a tendency to encourage his followers: he expended large sums in transporting and supplying them with all necessaries; and not aiming at a sudden fortune, by selling his lands at a very easy purchase. By this means, and the noble charter of privileges he gave the settlers, the country was soon changed from a wilderness to a garden, and is now one of the most flourishing countries in the new world; and still called after his own name. The climate of Pennsylvania is very agreeable, and the air sweet and clear. The fall, or autumn, begins about the 20th of October, and lasts till the beginning of December, when the winter sets in, which continues till March. Frosty weather, and extreme cold seasons, are frequently known here; so that the river Delaware, though very broad, is oftentimes froze over; but, at the same time, the weather is dry and healthy. The spring lasts from March to June, but the weather is then more inconstant than in the other seasons. The heats are very great in the months of July, August, and September, but mitigated so much by cool breezes, that they are very tolerable. The wind is at south west during great part of the summer, but generally at north and north-west in spring, fall, and winter; which, blowing over the frozen lakes and snowy mountains of Canada, is the true cause of the coldness of the weather in the winter season. The soil is in some places a yellow or black sand; in some a loamy gravel; and in others a fat mould, like the vales in England, especially near the inland brooks and rivers. The earth is fruitful, fat, and easy to be cleared, the roots of the trees being but a small distance below the surface of the ground. It is well watered with rivers, and produces every thing which can render life agreeable in the utmost plenty. In

short, there is no part of America in a more flourishing condition than Pennsylvania; nay, in some years, more people have transported themselves into this province than in all the others. In the grand convention which was held in Philadelphia, in the summer, 1787, the inhabitants in Pennsylvania were reckoned at 360,000. They are now much more numerous, amounting it is affirmed to about 500,000. The inhabitants of Pennsylvania consist of emigrants from England, Ireland, Germany, and Scotland. The Friends and Episcopalians are chiefly of English extraction, and compose about one-third of the inhabitants. They live principally in the city of Philadelphia, and in the counties of Chester, Philadelphia, Bucks, and Montgomery.

PENNY, or PENY, in commerce, an ancient English coin, which had formerly considerable course; but till lately had dwindled into an imaginary money, or money of account. Camden derives the word from the Latin *pecunia*, money.

The ancient English penny, penig, or pening, was the first silver coin struck in England; nay, the only one current among our Saxon ancestors; as is agreed by Camden, Spelman, Dr. Hicks, &c. The penny was equal in weight to our threepence: five of them made one shilling, or scilling Saxon; 30 a mark or mancuse, equal to our 7s. 6d. Till the time of king Edward I. the penny was struck with a cross, so deeply indented in it, that it might be easily broke; and parted, on occasion, into two parts, thence called halfpennies; or into four, thence called fourthings, or farthings. But that prince coined it without indenture; in lieu of which he first struck round halfpence and farthings.

He also reduced the weight of the penny to a standard; ordering that it should weigh 32 grains of wheat, taken out of the middle of the ear. This penny was called the penny sterling.—Twenty of these pence were to weigh an ounce; whence the penny became a weight as well as a coin. See STERLING and PENNY-WEIGHT.

The modern penny, containing the twelfth part of a shilling, or the 240th part of a pound, is a copper coin of rather variable weight, but not much less than an ounce.

PENNY, in ancient statutes, &c. is used for all silver money; and hence the ward-penny, aver-penny, hundred-penny, tithing-penny, and brothal-penny.

PENNYGANT, one of the highest mountains of England, in Yorkshire, seven miles N. of Settle. Its summit is 3930 feet above the level of the sea. On its sides are two awful orifices, called Hulpit and Huntpit holes; through each of them runs a brook, both of which pass under ground for about a mile, and cross each other in the bowels of the earth without mixing their waters.

PENNY-ROYAL, in botany. See MENTHA PULEGIUM.

PENNY-WEIGHT, a Troy weight, containing 24 grains; each grain weighing a grain of wheat gathered out of the middle of the ear, well dried. The name took its rise hence, that this was anciently the weight of one of our ancient silver pennies. See PENNY.—Twenty of these penny-weights make an ounce Troy.

PE'NNYWISE. *a.* (*penny* and *wise.*) Saving of small sums at the hazard of larger; niggardly on improper occasions (*Bacon*).

PE'NNYWORTH. *s.* (*penny* and *worth.*) 1. As much as is bought for a penny. 2. Any purchase; any thing bought or sold for money (*South*). 3. Something advantageously bought; a purchase got for less than it is worth (*Dry.*). 4. A small quantity (*Swift*)

PENRITH, a town in Cumberland, with a market on Tuesday, and a castle. Several remains of antiquity are seen in its neighbourhood. It is seated under a hill, near the rivers Eymot and Lowther, 18 miles S. of Carlisle, and 280 N.N.W. of London. Lon. 2. 52 W. Lat. 54. 40 N.

PENRUDDOCK (John), was zealous in the cause of his sovereign during the civil wars, and obtained the rank of colonel in the army. He was defeated by Croke, who, after he had promised him pardon, caused him to be beheaded in 1665. The letters which passed between him and his wife, after his condemnation, have been published by Steele, and exhibit him in the amiable light of the good christian and the loyal subject.

PENRYN, a borough in Cornwall, with a market on Wednesday, Friday, and Saturday. It has a great trade in the pilchard and Newfoundland fisheries, is governed by a mayor, and sends two members to parliament. It is seated on a creek of Falmouth Haven, three miles N.W. of Falmouth, and 266 W. by S. of London. Lon. 4. 59 W. Lat. 50. 10 N.

PENSACOLA, the capital of W. Florida, seated on a bay of the gulph of Mexico, which forms a very commodious harbour, where vessels may ride secure from every wind. Lon. 85. 24 W. Lat. 30. 32 N.

PENSANCE, or PENZANCE, a seaport in Cornwall, with a market on Thursday. It was burnt by the Spaniards in 1593, but has been rebuilt, and carries on a considerable traffic in pilchards and tin. It is one of the tin-coinage towns, and a corporation, governed by a mayor. It is seated on a creek of Mountsbay, 12 miles E. of the Land's End, and 281 W. by S. of London. Lon. 5. 35 W. Lat. 50. 11 N.

PENSFORD, a town in Somersetshire, with a market on Tuesday. It is noted for its hats and bread, and seated on the Chew, seven miles W. of Bath, and 117 W. by S. of London. Lon. 2. 30 W. Lat. 51. 23 N.

PE'NSILE. *a.* (*pensilis*, Latin.) 1. Hanging; suspended (*Bacon*). 2. Supported above the ground (*Prior*).

PE'NSILENESS. *s.* (from *pensile.*) The state of hanging.

PE'NSION. *s.* (*pension*, Fr.) An allowance made to any one without an equivalent (*Add.*).

To PE'NSION. *v. a.* (from the noun.) To support by an arbitrary allowance (*Addison*).

PE'NSIONARY. *a.* (*pensionnaire*, French.) Maintained by pensions (*Donne*).

PENSIONER, in general, denotes a person who receives a pension, yearly salary, or allowance. Hence,

The Band of Gentlemen Pensioners, the noblest sort of guard to the king's person consists of 40 gentlemen, who receive a yearly pension of 100l.

This honourable band was first instituted by Henry VIII. and their office is to attend the king's person, with their battle-axes, to and from his chapel-royal, and to receive him in the presence-chamber, or coming out of his privy-lodgings; they are also to attend at all great solemnities, as coronations, St. George's feast, public audiences of ambassadors, at the sovereign's going to parliament, &c.

They are each obliged to keep three double horses and a servant, and so are properly a troop of horse. They wait half at a time quarterly; but on Christmas-day, Easter-day, Whitsunday, &c. and on extraordinary occasions, they are all obliged to give their attendance. They have likewise the honour to carry up the sovereign's dinner on the coronation-day and St. George's feast; at which times the king or queen usually confers the honour of knighthood on two such gentlemen of the band as their captain presents. Their arms are gilt battle-axes; and their weapons, on horseback, in time of war, are cuirassiers-arms, with sword and pistols. Their standard in time of war is, argent, a cross gules. Their captain is always a nobleman, who has under him a lieutenant, a standard-bearer, a clerk of the check, secretary, pay-master, and harbinger.

PENSIONER, in the university of Cambridge and in that of Dublin, has a very peculiar meaning; for those students, either undergraduates or bachelors of arts, are called pensioners who live wholly at their own expence, and who receive no emolument whatever from the college of which they are members. They are divided into two kinds, the greater and the less; the former of which are generally called fellow-commoners, because they eat with the fellows of their college; the latter are always called pensioners, and eat with the scholars, who are those students of the college, either under-graduates or bachelors, who are upon the foundation, who receive emoluments from the society, and who are capable of being elected fellows. See SERVITOR and SIZAR.

PE'NSIVE. *a.* (*pensif*, Fr. *pensivo*, Italian.) Sorrowfully thoughtful; sorrowful; mournfully serious; melancholy (*Pope*).

PE'NSIVELY. *ad.* With melancholy; sorrowfully; with gloomy seriousness (*Spenser*).

PE'NSIVENESS. *s.* (from *pensive.*) Melancholy; sorrowfulness (*Hooker*).

PENSTEMON, in botany, a genus of the class didynamia, order angiospermia. Calyx five-leaved; corol two-lipped, inflated; rudiment of a fifth filament bearded; capsule two-celled. Four species natives of Virginia, or of Mexico. Of these one, P. lævigata, is cultivated in our pleasure gardens, with dichotomous flowering branches, flowers two together, corol pale purple, somewhat hirsute on the outside.

PENSTOCK, a sluice or flood-gate, serving to retain or let go at pleasure the water of a mill-pond, or the like.

PENT. part. pass. of *pen*. Shut up. (*Dryden*).

PENTACA'PSULAR. *a.* (πεντε and *capsular.*) Having five cavities.

PE'NTACHORD. *s.* (πεντε and χορδη.) An instrument with five strings.

PENTACOCCOUS CAPSULE, in botany, a five-grained capsule. Swelling out in five protuberances; or, having five united cells, with one seed in each.

PENTADACTYLON. Five fingers. In botany, a name given by some authors to the ricinus, or palma Christi, from the figure of its leaf.

PENTAGON, in geometry, a plane figure consisting of five angles, and consequently five sides also. If the angles be all equal, it is a regular pentagon.

It is a remarkable property of the pentagon, that its side is equal in power to the sides of a hexagon and a decagon inscribed in the same circle; that is, the square of the side of the pentagon, is equal to both the squares taken together of the sides of the other two figures; and consequently those three sides will constitute a right-angled triangle. To find the area of a regular pentagon, multiply the square of its side into the number 1.7204774.

PENTA'GONAL. *a.* Quinquangular; having five angles.

PENTAGONOUS or PENTAGONAL STEM. A five-cornered stem. It is a species of Linnéus's ancipital stem, and he seems to distinguish it from quinquangular.—He describes the capsule of euonymus as being pentagona; quinquangularis.

PENTAGRAPH, or PARALLELOGRAM, an instrument whereby designs of any kind may be copied in what proportion you please, without being skilled in drawing.

A pentagraph is composed of 4 bars, ABDE, plate 133, fig. 1. usually of brass; the bar A is jointed to B at *b* about the middle, and at *a* it is connected with E: the bar B is the same length as A; and at *d* is jointed to the bar *d*, whose end is connected with the end of E; these four bars form a parallelogram: thus, $ba = D$, and $bd = E$. To the other end of the bar A, a tube F is soldered, through which a pointed brass rod *e*, called the tracer, is put; the end of the bar B has a slider G upon it, which has a tube similar to F; another slider I of the same kind is mounted on the bar D. These sliders have screws, by which they can be fixed at any distance. Under each of the joints of the base a small tube is fixed, in the bottom of which is a small castor as H, which makes the instrument run easily on the table. When the instrument is used, the two sliders GI must be set exactly in a line with the tube

F; when it is required to make a copy of a drawing of the same size, the sliders must be set so that from F to I is the same distance as from I to G; the tube I must then have a wire put through it, whose lowest end is fast screwed to a heavy leaden weight, L; this must have three sharp points in the under side, so that when it is set on the table it may not be liable to move; then if a design or drawing is laid under the tube F, and the point of the tracer drawn over the lines of it, the point of the pencil at G will describe a similar figure. If the drawing is to be reduced to one-half of the size, the weight must be put to the slider G, and the pencil into I, without moving either slider; then the distance from the tracer to the fixed point or weight L, is twice the distance of the pencil to the weight. The rule for setting the sliders for any proportion is, as the distance between the tracer *e* and the fixed point L, is to the distance between the pencil G and the same, so is the length of any line described by the tracer, to the length of the line at the same time described by the pencil. To avoid the trouble of measuring these distances each time, the bars B and D are divided into ten or twenty of the most common proportions, by which divisions the sliders are to be fixed.

The construction of one of the sliders is shewn in fig. 2; where M is a piece of brass, to one corner of which a tube *g* is soldered; an opening of the same width as the bar is cut in this, and a cover N is screwed on with two screws: this cover has a screw with a mill-head through it, by which the slider is fixed. A piece of brass O, a little bent, is put between the bar and the under side of the cover, and whose elasticity prevents the slider moving too freely when the screw is slack, and defends the bar from being scratched by the ends of the screw when it is fixed.

Fig. 3, describes the method of making the joints of the rods: P is the end of one bar, which has a steel spindle *p* screwed fast to it; the other bar *o* has a cock *v*, screwed on, whose upper end projects over the tube *t*, and has a hole through it, just over the hole in the tube. The ends of the spindle P are put between the holes in the cock and the hole in the tube; if the spindles are well fitted, this joint is very steady, and without any shake. The lower end of the tube *t* has a hole drilled in it, into which the spindle W of the castor is put; the castor is kept from falling out of the tube, by the point of a small screw going through the side of the tube *t*, which takes into a notch cut round in the top of the spindle *w*. When the machine is used, a fine line, RR, is put through rings in the cocks *bd*, and tied to the pencil; the other end has a loop to be hooked over the thumb of the operator, by pulling which he can raise the pencil at D, when he does not wish it to mark.

In order to prove that the figure described by a pentagraph is similar to the given figure; let C, fig. 4, be the fixed centre of motion; P the pencil for tracing the given figure PP, and *p* the pencil, which traces the other figure *pp*; *p*, &c. must be so adjusted, that *p*, C and P, may lie in one strait line; then, since B*p* : A*p* : : BP : AC, whatever be the situation of the pentagraph, the angles PCP and *p*C*p*, are vertical, and, therefore, PC*p* will in every position of the instrument be a right line: but PC : *p*C : : BA : A*p*, in each of the two positions in the figure, and consequently the triangles PCP, *p*C*p*, are similar; and PP : *pp* (: : PC : *p*C) : : BA : A*p*, or in a given ratio. Hence it appears, that by moving the pencil *p*, A*p* may be equal to BA, or less in any proportion; and consequently *pp* may be equal to PP, or less, in the same proportion.

PENTAGYNIA, in botany, the name of one of the orders in the fifth, tenth, eleventh, twelfth, and thirteenth classes in the Linnéan system; containing those plants which have five pistils in a hermaphrodite flower.

PENTAMETER. (from πενταμετρος, q. d. five measures.) In poetry, a kind of verse, consisting of five feet or metres.

The two first feet of a pentameter may be either dactyls or spondees; the third must be always a spondee; and the two last anapæsts.

It is usually joined to hexameters, in elegies, epistles, epigrams, and other little pieces. There is no work extant of pentameters alone.

PENTANDRIA, in botany, the name of the fifth class in Linnéus's system; comprehending those plants which have hermaphrodite flowers with five stamens.

PENTA'NGULAR. *a.* (πεντε and *angular.*) Five cornered (*Grew*).

PENTAPE'TALOUS. *a* (πεντε and πεταλον.) Having five petals or leaves.

PENTAPETES. In botany, a genus of the class monadelphia, order dodecandria. Calyx double, the outer three-leaved, caducous; petals five; stamens twenty, five of them barren; style obsoletely five-toothed; capsules five-celled, many-seeded; with the partitions contrary. One species, P. Phœnicea, scarlet-flowered pentapetes, an East-Indian annual, which dies in the autumn, soon after it has ripened its seeds.

PENTAPHYLLOUS CALYX, in botany, a five-leaved calyx, or rather perianth: as in Cistus, Adonis, Cerbera.

PENTAPHYLLUM. (*pentaphyllum*, πενταφυλλον, from πεντε, five, and φυλλον, a leaf; so named because it has five leaves on each stalk.) Common cinquefoil, or five-leaved grass. The roots of this plant, potentilla reptans; foliis quinatis, caule repente, pedunculis unifloris of Linnéus. C. O. Icosandria, polygynia; have a bitterish styptic taste. They were used by the ancients in the cure of intermittents; but the medicinal quality of cinquefoil is confined, in the present day, to stop diarrhœas and other fluxes. See POTENTILLA.

PENTAPOLIS, a part of Africa, near Cy-

rene. It received this name on account of the five cities which it contained; Cyrene, Arsinoe, Berenice, Ptolemais or Barce, and Apollonia.

PENTASPACT. *s.* (πεντε and σπαω.) An engine with five pullies.

PENTASTIC. *s.* (πεντε and στιχος.) A composition consisting of five verses.

PENTASTYLE. *s.* (πεντε and στυλος.) In architecture, a work in which are five rows of columns.

PENTATEUCH. This word, which is derived from the Greek πεντατευχος, from πεντε, five, and τευχος, an instrument or volume, signifies the collection of the five instruments or books of Moses, which are Genesis, Exodus, Leviticus, Numbers, and Deuteronomy; each of which books we have given an account of under their several names.

The Jews read the whole Pentateuch every year; and for this purpose they divide it into paragraphs or sections, which they distinguish into great and small. The great are those which they read in a week, of which there are fifty-four (see PARASCHE): and the small regard particular matters. Each greater section, which is denominated by the word with which it begins, is divided into seven parts, because they are read by so many different persons: the priest begins, afterwards a Levite; and in the choice of the other readers respect is paid to the rank of the people. After the text of Moses, they read a paragraph of the paraphrase of Onkelos. The books of the prophets are also divided in the same manner.

PENTATHLON, πενταθλον, in antiquity, the five exercises performed at the Grecian games, and for which prizes were proposed.

These exercises were wrestling, darting, leaping, running, and quoit-playing. He who bore away the prize in them all was called pentathlus; by the Latins, quinquertio; as the five exercises themselves were by those latter people called quinquertium.

PENTATONON, in the ancient music, a concord, by us called the redundant sixth.

It consists of four tones, and a major and minor semitone; whence the name, pentatonon, q. d. five tones.

PENTECONTARCHA, among the ancients, the captain or commander of a galley, called penteconteros.

PENTECONTEROS, πεντηκοντηρος, a vessel with fifty oars.

PENTECOST, πεντηκοστη, Whitsuntide; a solemn feast of the church, held in commemoration of the descent of the Holy Ghost on the apostles; as described in the Acts. See WHITSUNTIDE.

It has its name from the Greek πεντηκοστη, q. d. quinquagesimus, fiftieth, because held on the fiftieth day after Easter.

In the ancient church Pentecost finished the paschal time, or Easter season; wherein, as Tertullian, St. Jerom, &c. observe, Hallelujah was sung every where, the office celebrated standing, no fasting allowed, &c.

The Jews likewise had a feast they called Pentecost, or Quinquagesimus, solemnized in memory of the Laws being given to Moses, fifty days after their departure out of Egypt.

This was the second of the three grand festivals in the ecclesiastical year, at which all the males were to appear before the Lord at the national altar. It is called by several names in the Old Testament; as the Feast of Weeks, because it was celebrated seven weeks, or a week of weeks, after the Passover, or rather, after the first day of the feast of unleavened bread; the Feast of Harvest, according to Mede and Bochart, because, as the harvest begun at the Passover, it ended at Pentecost; or, according to others, because at this feast the first fruits of their wheat harvest were brought and offered to God; and the Feast of First Fruits.

PENTECOSTALS, *Pentecostalia*, anciently, were pious oblations made at the feast of Pentecost, by the parishioners to their parish-priest; and sometimes by inferior churches or parishes, to the principal or mother-church.

PENTHESILEA, a queen of the Amazons, daughter of Mars. She came to assist Priam in the Trojan war, and fought against Achilles, by whom she was slain. The hero was so struck with the beauty of Penthesilea when he stripped her of her arms, that he even shed tears for her fate. Thersites laughed at the partiality of the hero, for which ridicule he was instantly killed. The death of Thersites so offended Diomedes, that he dragged the body of Penthesilea out of the camp, and threw it into the Scamander. It is generally supposed, that Achilles was enamoured of the Amazon before he fought with her, and that she had by him a son called Cayster.

PENTHEUS, son of Echion and Agave, king of Thebes in Bœotia, forbad his subjects to pay adoration to Bacchus. He even ordered the god himself, who conducted the Theban women in the celebration of the orgies, to be seized and imprisoned. The god however escaped, and Pentheus then commanded all the bacchanals to be destroyed. And when the Theban women had gone out of the city to celebrate the orgies of Bacchus, Pentheus, apprized of the debauchery which attended the solemnity, ordered the god himself, who conducted the religious multitude, to be seized. His orders were obeyed with reluctance; but when the doors of the prison in which Bacchus had been confind, opened of their own accord, Pentheus became more irritated, and commanded his soldiers to destroy the whole band of the bacchanals. Bacchus then inspired the monarch with an ardent desire of seeing the orgies. Accordingly he hid himself in a wood for the purpose on mount Cithæron. But his curiosity proved fatal; the bacchanals all rushed upon him. His mother was the first who attacked him, and next her two sisters, Ino and Autonoe, and his body was torn to pieces.

PENTHORUM, in botany, a genus of the class decandria, order decagynia. Calyx

five or ten-cleft; petals from none to five; capsule five-beaked, five-celled. One species: an herbaceous plant of Virginia.

PE'NTHOUSE. *s.* (*pent*, from *penté*, Fr. and *house*.) A shed hanging out aslope from the main wall (*Knolles*).

PE'NTICE. *s.* (*pendice*, Italian.) A sloping roof (*Wotton*).

PE'NTILE. *s.* (*pent* and *tile*.) A tile formed to cover the sloping part of the roof (*Moxon*).

PENT *up. part. a.* (*pent*, from *pen*, and *up*.) Shut up (*Shakspeare*).

PENTLAND FRITH, a strait which divides the Orkney Islands from Caithnessshire, in Scotland. It is 20 miles long and 10 broad, and very dangerous to those who are not well acquainted with its tides and currents; especially in passing the Pentland Skerries, a cluster of rocks at the E. entrance of the frith.

PENTLAND HILLS, a ridge of mountains, in Edinburghshire, extending about ten miles from S.W. to N.E.

PENULTIMA, or PENULTIMATE SYLLABLE, in grammar, denotes the last syllable but one of a word: and hence the antepenultimate syllable is the last but two, orthat immediately before the penultima.

PENUMBRA, in astronomy, a partial shade observed between the perfect shadow and the full light in an eclipse. It arises from the magnitude of the sun's body; for, were he only a luminous point, the shadow would be all perfect; but, by reason of the diameter of the sun, it happens that a place which is not illuminated by the whole body of the sun does yet receive rays from a part thereof.

PENU'RIOUS. *a.* (from *penuria*, Latin.) 1. Niggardly; sparing; not liberal; sordidly mean (*Prior*). 2. Scanty; not plentiful (*Addison*).

PENU'RIOUSLY. *ad.* (from *penurious*.) Sparingly: not plentifully.

PENU'RIOUSNESS. *s.* (from *penurious*.) 1. Niggardliness; parsimony (*Addison*). 2. Scantiness; not plenty.

PE'NURY. *s.* (*penuria*, Lat.) Poverty; indigence (*Hooker*).

PENTRIA, in botany, a genus of the class syngenesia, order polygamia æqualis. Receptacle naked; seeds crowned with a jagged membranaceous margin; calyx imbricate, hæmisphærical. One species, a Cape plant, by some regarded as a tanacetum, with silky downy branches; leaves crowded, wedge-form, unequally crenate at the tip; umbel terminal.

PE'ONY, in botany. See PÆONIA.

PE'OPLE. *s.* (*peuple*, Fr. *populus*, Latin.) 1. A nation; those who compose a community (*Shakspeare*). 2. The vulgar (*Waller*). 3. The commonalty; not the princes or nobles (*Addison*). 4. Persons of a particular class (*Bacon*). 5. Men, or persons in general (*Arbuthnot*).

To PE'OPLE. *v. a.* (*peupler*, Fr.) To stock with inhabitants (*Prior*).

PEPIN DE HERISTAL, or LE GROS, mayor of the palace under Clovis III. Childebert, and Dagobert. The power of these mayors in France was so great, that they left the sovereign only the empty title, and in the end seized on the throne itself.

PEPIN LE BRIEF, or LE PETIT, grandson to Pepin le Gros, and first king of the second race of French monarchs, was mayor of the palace to Childeric III. a weak prince. He contrived to confine him and his son Thierri in different monasteries; and then, with the assistance of pope Stephen III. he usurped the sovereign power. He died in 768, aged 54.

PEPLIS. Water-purslane. In botany, a genus of the class hexandria, order monogynia. Calyx campanulate, with a twelve-cleft mouth; petals six, inserted into the calyx; capsule superior, two-celled. Two species, creeping plants, one common to our own marshes, one a native of India.

PEPLUS, a long robe worn by the women in ancient times, reaching down to the feet, without sleeves, and so very fine that the shape of the body might be seen through it. The Athenians used much ceremony in making the peplus, and dressing the statue of Minerva with it. Homer makes frequent mention of the peplus of that goddess.

PEPPER. In botany. See PIPER.

PEPPER (Bell). In botany. See CAPSICUM.

PEPPER (Bird). In botany. See CAPSICUM.

PEPPER (Grape). In botany. See VITIS.

PEPPER (Guinea). In botany. See CAPSICUM.

PEPPER (Jamaica). In botany. See MYRTUS.

PEPPER MINT. In botany. See MENTHA.

PEPPER WALL. In botany. See SEDUM.

PEPPER WORT. In botany. See LEPIDIUM.

To PEPPER. *v. a.* (from the noun.) 1. To sprinkle with pepper. 2. To beat; to mangle with shot or blows (*Shakspeare*).

PE'PPERBOX. *s.* (*pepper* and *box*.) A box for holding pepper (*Shakspeare*).

PE'PPERCORN. *s.* 1. A corn of pepper. 2. Any thing of inconsiderable value.

PEPTICS. (πεπτικα, from πεπτω, to ripen.) In medicine, digestive ointments and other materials.

PEPUSCH (John Christopher), a musician, born at Berlin, 1667. At the age of fourteen he was employed at the Prussian court as a teacher of music. In 1700, he came over to England, and was engaged at Drury-lane; and in 1713, he was admitted doctor of music at Oxford. About 1725, he married de l'Epine, an Italian singer of light character, but who had, by her engagements on the stage, amassed a fortune of 10,000 guineas. This woman, whose figure and complexion entitled her to the appellation of Hecate, by which her husband distinguished her, brought him one son, who died early. Pepusch died 1752, aged 85.

PEPYS (Samuel), an Englishman, secretary to the admiralty under Charles II. and his brother. He introduced regularity, and method in his department, and devoted himself to the collecting of memoirs of the navy, and other valuable documents, preserved at Magdalen college, Cambridge. To his judicious arrangements Britain is much indebted for her superiority in naval affairs, which she began to acquire after the civil wars. He died 1703.

PERACU'TE. *a.* (*peracutus*, Latin.) Very sharp; very violent (*Harvey*).

PERADVE'NTURE. *ad.* (*par adventure*, French.) 1. Perhaps; may be; by chance (*Digby*). 2. Doubt; question: not properly (*South*).

To PERA'GRATE. *v. a.* (*peragro*, Latin.) To wander over; to ramble through.

PERAGRA'TION. *s.* (from *peragrate*.) The act of passing through any state or space (*Holder*).

To PERA'MBULATE. *v. a.* (*perambulo*, Lat.) 1. To walk through. 2. To survey, by passing through (*Davies*).

PERAMBULA'TION. *s.* (from *perambulate*.) 1. The act of passing through or wandering over (*Bac.*). 2. A travelling survey. 3. A district; limit of jurisdiction (*Holyday*).

PERAMBULATOR, an instrument for measuring distances, invented by bishop Wilkins. It is also sometimes called pedometer, waywiser, and surveying wheel.

This wheel is contrived to measure out a pole, or $16\frac{1}{2}$ feet, in making two revolutions; consequently its circumference is $8\frac{1}{4}$ feet, and its diameter 2·626 feet, or 2 feet $5\frac{1}{2}$ inches and $\frac{12}{1000}$ parts, very nearly. It is either driven forward by two handles, by a person walking; or is drawn by a coach wheel, &c. to which it is attached by a pole. It contains various movements, by wheels, or clock-work, with indices on its face, which is like that of a clock, to point out the distance passed over, in miles, furlongs, poles, yards, &c.

Its advantages are its readiness and expedition; being very useful for measuring roads, and great distances on level ground. See the fig. pl. 133, fig. 5.

An ingenious contrivance of this kind which deserves attention here, is the pedometer invented by Mr. Lowin Tugwell, of Beverstone, in the county of Gloucester, and which is represented in pl. 133, fig. 6. where A, is the stock of the pedometer; B, B, B, &c. twelve spokes; one end of which is fastened by means of a screw to the outward ring, or periphery of the wheel, while the other is inserted in the stock. C, the periphery, which is an iron ring sixteen and half feet, or one pole, in circumference; and which is divided into twenty-five equal parts, corresponding to the links of Gunter's chain for land-measuring, &c. D,D,D, &c. are twelve small plates, representing the separate spokes, and each of which includes two links of the chain above-mentioned; the twelfth spoke being divided at its foot, for comprehending the twenty-fifth link. E, an iron axis, being a screw with 320 circumlocutions, each of which is marked separately on an engraved index on one of its sides; and, in order to apply this part of the machine, it is screwed firmly into the stock of the wheel, with which it revolves when in motion. F, a style, or alidade, being an expanding screw-nut, that embraces the axis, along which it screws, as the latter revolves with the wheel; and as each revolution describes an exact longitudinal pole (four of which are computed to a chain), the style being pendant, and moving towards its proper figure, denotes the length of ground passed; and it is divided into chains and poles on the index of the axis E, and into links on the periphery C. G, is a small adjusting screw; which being turned, the style may be removed to the beginning of the index, after the given line, in surveying or measuring land, has been ascertained in chains, poles, &c. H, represents a cross, or square, with sights for determining perpendiculars in land-measuring. It is suspended at its ends on the axis, whence it may be occasionally detached by a simple touch of the finger and thumb, when in use. Further, this cross prevents the style from being revolved with the axis by any accident. As the 320 divisions marked on the index of the axis E, describe a mile, the style F, after having passed over them, will stop: and, as it will now move round with the axis, it will carry with it the standard; which will strike on the wrist of the operator, and thus prevent him from proceeding to any further distance, till he withdraws his hand from between such standard and the axis. Having received this hint, he turns the screw G; puts the style F back to the bottom of the index; and continues the revolution of the machine, till he has completed his course.

Mr. Tugwell's contrivance is particularly calculated to prevent error in measuring land: as one person may thus survey with greater accuracy and expedition, than by the use of the chain alone. Besides, no fraud can possibly be commited by labourers, in measuring task-work; a circumstance of the utmost importance to agriculturists.

PERCA. Perch. In zoology, a genus of the class pisces, order thoracica. Jaws unequal; teeth sharp, incurved; gill-covers scaly, of three laminæ, the upper serrate; gill-membrane seven-rayed; lateral line arched with the back; scales hard, rough; fins spinous; vent nearer the head than the tail. Sixty species, scattered through the seas of the globe, four or five of which are found in waters belonging to our own country. They are thus divided into sections.

A. Dorsal fins two, distinct.

B. Dorsal fin single; tail undivided.

C. Dorsal fin single; tail forked.

The following are chiefly worthy of notice:

1. P. fluviatilis. Common or river Perch. Second dorsal fin with sixteen rays.

2. P. labrax. Basse. Second dorsal fin with fourteen rays; back dusky, tinged with blue; belly white.

Both these are British fishes, and possess a peculiar tenacity to life. The former grows to two

feet long; swims with great swiftness at a certain height in the water; easily takes a bait; feeds on aquatic insects and smaller fishes; spawns in May and June, and is very prolific; it has no real air-bladder, and from its integuments may be obtained a kind of glue.

The ancients were acquainted with this species; and among them it was deemed one of the first delicacies of the table.

> *Nec te, delicias mensarum, perca, silebo*
> *Amnigenos inter pisces dignande marinis.*
> AUSONIUS.

Rondelet, and after him Gesner, blames the physicians in his time for ordering the river perch to their patients in febrile disorders, after a prescription of Galen, who meant the sea perch, a fish much lighter, as he alleges, and easier of digestion. Experience, however, has shewn that this distinction is made without a difference; both the sea and river kind being found equally palatable and salubrious. In the time of Willoughby this prejudice against the river perch had been forgotten: he approves of the taste of Ausonius, in deeming the flesh of this animal a great delicacy.

The river perch is easily caught with common earth worms, or small frogs, for a bait; and is so voracious, that the angler, who falls in with a shoal of them, will sometimes kill the whole. This species seldom grows to a large size, few being found above five or six pounds, and the greater number much below this weight. The body is deep and oval shaped; the scales rough; the back much arched; the side line nearer it than the belly. A minute description of a fish so common would be unnecessary.

The basse is distinguished by an uncommon degree of voracity, and hence was termed a wolf (*lupus*) by Ovid, a name frequently adopted by succeeding writers. In the salt water pools of Italy, it sometimes attains to a prodigious size, and weighs fifteen pounds; the flesh is extremely grateful to the taste: in the lakes these fishes are frequently found by the fishermen frozen to death, as they suppose, but more probably suffocated by the exclusion of the air from the surface of the water; a circumstance from which Willoughby takes occasion to caution those who keep them in ponds to break the ice frequently during the continuance of frost. This species inhabits indiscriminately lakes, rivers, and the sea; to the two former, however, they probably ascend from the sea, for they do not seem to breed in fresh water.

Upon the back there are two fins, both radiated with spines: behind the anus another arises and proceeds towards the tail, strengthened with fourteen rays; the three first spinous: the pectoral and ventral fins have each a mixture of prickly and cartilaginous rays. The scales are very thick set. The body is shaped like a salmon.

3. P. scandens. Climbing perch. Dorsal fin with seventeen spinous and eight soft rays; scales rough with a whitish denticulate edge. Inhabits rivers in Tranquebar, about a palm long; has the very singular habit of crawling up trees, which it effects by means of the spines in the gill-covers, and spinous rays of the other fins. Body covered with a black slimy mucus, above dusky green, lighter on the sides, beneath pale-golden.

4. P. cernua. Ruffe. Dorsal fin twenty-seven rayed, spines fifteen; head thick, compressed; eyes large, pupil blue, irids brown with a yellow mark. Inhabits the clear streams of our own country and of Europe generally; from six to eight inches long; body round, mucous, sides yellowish-dirty green, spotted with black, breast white, nape and back blackish; feeds on smaller fishes, and is the prey of larger and of various aquatic birds; is exceedingly fertile, and spawns in March or April: flesh good.

5. P. nigra. Black fish. Body narrow, with small thin scales. Inhabits Cornwall; length fifteen inches. A very indistinct species

6. P. formosa. Squirrel fish. Tail lunate; head marked with blue lines and blotches. Inhabits Carolina; gill-covers toothed; anterior part of the dorsal fin abbreviate towards the hind-part.

PE'RCASE. *ad.* (*par* and *case.*) Perchance, perhaps: not used (*Bacon*).

PE'RCEANT. *a.* (*perçant*, Fr.) Piercing; penetrating: obsolete (*Spenser*).

PERCE'IVABLE. *a.* (from *perceive.*) Perceptible; such as falls under perception (*Locke*).

PERCEIVABLY. *ad.* (from *perceivable.*) In such manner as may be observed or known.

To PERCE'IVE. *v. a.* (*percipio*, Lat.). 1. To discover by some sensible effects (*Shaks.*). 2. To know; to observe (*Locke*). 3. To be affected by (*Bacon*).

PERCEPTIBI'LITY. *s.* (from *perceptible.*) 1. The state of being an object of the senses or mind; the state of being perceptible. 2. Perception; the power of perceiving: not proper (*More*).

PERCE'PTIBLE. *a.* (*perceptible*, French, *perceptus*, Latin.) Such as may be known or observed (*Bacon*).

PERCE'PTIBLY. *ad.* (from *perceptible.*) In such a manner as may be perceived (*Pope*).

PERCE'PTION. *s.* (*perceptio*, Lat.) 1. The power of perceiving; knowledge; consciousness (*Bentley*). 2. The act of perceiving; observation. 3. Notion; idea (*Hale*). 4. The state of being affected by something (*Bacon*).

PERCEPTION is a word which cannot but be well understood, though it is difficult for the lexicographer to give any explanation of it. It has been called the first and most simple act of the mind by which it is conscious of its own ideas. This definition, however, is improper, as it confounds perception with consciousness; although the objects of the former faculty are things without us, those of the latter the energies of our own minds. Perception is that power or faculty by which, through the medium of the senses, we have the cognizance of objects distinct and apart from ourselves, and

learn that we are but a small part in the system of nature.

PERCEPTIVE. *a.* (*perceptus*, Lat.) Having the power of perceiving (*Glanville*).

PERCEPTI'VITY. *s.* (from *perceptive.*) The power of perception or thinking (*Locke*).

PERCH, in ichthyology. See PERCA.

PERCH, in land measuring, a rod or pole of 16½ feet in length, of which 40 in length and 4 in breadth make an acre of ground. But, by the customs of several counties, there is a difference in this measure. In Staffordshire it is 24 feet; and in the forest of Sherwood 25 feet, the foot being there 18 inches long; and in Herefordshire a perch of ditching is 21 feet, the perch of walling 16½ feet, and a pole of denshiered ground is 12 feet, &c.

PERCH, the small horizontal bar in a cage, on which a bird sits.

PERCH OF A CARRIAGE, the bar which joins the axle-tree of the front wheels to that of the hind wheels.

To PERCH. *v. n.* (*percher*, French; from the noun.) To sit or roost as a bird (*Spenser*).

To PERCH. *v. a.* To place on a perch (*More*).

PERCHA'NCE. *ad.* (*per* and *chance.*) Perhaps; peradventure (*Wotton*).

PE'RCHERS. *s.* Paris candles used in England in ancient times; also the larger sort of wax candles, which were usually set upon the altar.

PERCHE, a late province of France, in Orleanois, 35 miles long and 30 broad; bounded on the N. by Normandy, on the W. and S. by Maine, and on the E. by Beauce. It takes its name from a forest, and is pretty fertile. It now forms, with part of Normandy, the department of Orne.

PERCH FISHING. See ANGLING and FISHING.

PERCI'PIENT. *a.* (*percipiens*, Latin.) Perceiving; having the power of perception.

PERCI'PIENT. *s.* One that has the power of perceiving (*Glanville*).

PERCIVAL (Thomas), a physician, born and educated at Warrington, Lancashire. He studied at Edinburgh, and took his degrees at Leyden, 1765. He settled in 1767, at Manchester, where he continued to practise with increasing reputation till his death in 1804. He was a most amiable man, and to his zeal in the cause of philosophy Manchester is chiefly indebted for the establishment of its literary society, to whose memoirs he made many contributions. He published besides, Moral and Literary Dissertations; Medical Ethics, &c. besides a Father's Instructions to his Children, &c. In his principles Dr. Percival was a dissenter, but he was not so averse to the episcopalian religion, as to prevent one of his children from devoting himself to the ministry of the establishment.

PE'RCLOSE. *s.* (*per* and *close.*) Conclusion; last part: obsolete (*Raleigh*).

To PE'RCOLATE. *v. a.* (*percolo*, Latin.) To strain through (*Hale*).

PERCOLA'TION. *s.* (from *percolate.*) The act of straining; purification or separation by straining (*Ray*).

To PERCU'SS. *v. a.* (*percussus*, Latin.) To strike (*Bacon*).

PERCU'SSION. *s.* (*percussio*, Latin.) 1. The act of striking; stroke (*Newton*). 2. Effect of sound in the ear (*Rymer*).

PERCUSSION, and COLLISION, are nearly synonymous, both being distinguishable from the pressure by the circumstance of velocity. A body operates upon another by pressure when it is at rest (at least, as to sense) and acts by its mere weight; and when a body which is moving acts upon another body which opposes its motion, it operates upon that body by percussion.

Percussion is either direct or oblique: and it is generally considered with regard to bodies that are perfectly or imperfectly elastic, or non elastic.

Direct percussion is that in which the impulse is made in the direction of a line perpendicular at the place of impact, and which also passes through the common centre of gravity of the two striking bodies. As is the case in two spheres, when the line of the direction of the stroke passes through the centres of both spheres; for then the same line, joining their centres, passes perpendicularly through the point of impact. And

Oblique percussion is that in which the impulse is made in the direction of a line that does not pass through the common centre of gravity of the striking bodies; whether that line of direction is perpendicular to the place of impact, or not.

The force of percussion is the same as the momentum, or quantity of motion, and is represented by the product arising from the mass or quantity of matter moved, multiplied by the velocity of its motion.

The nature and laws of percussion have been investigated by Aristotle, Galileo, Des Cartes, Huygens, and others. Aristotle started the idea that percussion and weight are incomparable; and most moderns have acquiesced in that opinion. Mr Leibnitz paid much attention to this subject; but not with great success. Conformably to his whimsical doctrine of living and dead forces, the action of gravity, or of a spring, is a *vis viva*, when it actually produces motion in the body on which it acts; but when a stone lies on a table, and presses on it, this pressure is a *vis mortua*. Its exertion is made, and in the same instant destroyed, by an opposite *vis mortua*. Each of these exertions would have produced a beginning of motion (something different from any the smallest local motion); and the sum of all would, after a certain time, have amounted to a sensible motion and velocity. There seems no distinct conception to accompany, or that can accompany, this language. And, as a proof that Leibnitz had no distinct conceptions of the matter, he has recourse to an experiment of Galileo in support of his genesis of a sensible motion from the continual exertions of the *vis mortua*; and he concludes that the force of percussion is infinitely, or incomparably, greater than pressure, because it is the sum total of an infinity of individual exertions of *vis mortua*. Nothing but the authority which Leibnitz has acquired on the continent, by the zealous efforts of his partizans, could excuse our taking up any time in considering this unintelligible discourse. Surely, if there is such a thing as a *vis viva*, it exists in the moving water in Galileo's experiment, and its impulsions are not continual exertions of a *vis mortua*. Nor is it possible to conceive continual impulse, or a

beginning of motion that is not motion, &c. &c. It is paradoxical (and Leibnitz loved to raise the wonder of his followers by paradoxes) to say that percussion is infinitely greater than pressure, when we see that pressure can do every thing that can be done by percussion. Nay, Euler, by far the most able supporter of the doctrines of Leibnitz, about the force of bodies in motion, actually compares these two forces; and, in his Commentary on Robins's Artillery, demonstrates, in his way, that when a musket ball, moving with the velocity of 1700 feet per second, penetrates five inches into a block of elm, the force of its percussion is 107,760 times its weight. John Bernoulli restricts the infinite magnitude of percussion to the case of perfectly hard bodies; and, for this reason alone, says, that there can be none such in the universe. But, as this justly celebrated mathematician scouts with scorn the notion of attractions and repulsions, he must allow, that an ultimate atom of matter is unchangeable in its form; which we take to be synonymous with saying that it is perfectly hard. What must be the result of one atom in motion hitting another at rest? Here must be an instantaneous production of a finite velocity, and an infinite percussion. A doctrine which reduces its abetters to such subterfuges, and engages the mind in such puzzling contemplations, cannot (to say the best of it) be styled an explanation of the laws of nature. The whole language on the subject is full of paradoxes and obscurities. In order to reconcile this infinite magnitude of percussion with the observed finite magnitude of its effects, they say that the pressure, or instantaneous effort, has the same relation to the force of percussion that an element has to its integral; and in maintaining this assertion, they continually consider this integral under the express denomination of a sum total, robbing Leibnitz's great discovery of the infinitesimal calculus of every superiority that it possessed over Wallis's Arithmetic of Infinites, and really employing all the erroneous practices of the method of indivisibles. We look upon the strange things which have been inculcated, with pertinacious zeal, in this doctrine of percussion and *vires vivæ*, as the most remarkable example of the errors into which the unguarded use of Cavalerius's Indivisibles, and of the Leibnitzian notion of the infinitesimal calculus, have led eminent mathematicians. It is not true that the pressure, and the ultimate force of percussion, have this relation; nor has the pressure and the resulting motion, which is mistaken for the measure of this ultimate force, any mathematical relation whatever. The relation is purely physical; it is the relation of pure cause and effect; and all that we know of it is their constant conjunction. The relation of fluxion and fluent is not a mathematical or measurable relation, but a connection in thought; which is sufficient for making the one an indication of the other, and the measures of the proportions of the one a mean for obtaining a measure of the proportions of the other. In this point of view, the relation of pressure to motion, as the measure of the force of percussion, resembles that of fluxion and fluent, but is not the same.

Much has been said by the partizans of Mr. Leibnitz about the incomparableness of pressure and percussion, and many experimental proofs have been adduced of the incomparable superiority of the latter. Bulfinger says, that the pressure of many tons will not cause a spike to penetrate a block of hard oak half so far as it may be driven by a weak man with one blow of a mallet; and that a moderate blow with a small hammer will shiver to powder a diamond, which would carry a mountain without being hurt by its pressure. Nay, even Mr. Camus, of the Academy of Paris, a staunch Cartesian, and an eminent mechanician, says that he beat a leaden bullet quite flat with a hammer of one pound weight, without much force; and that he found that 200 pounds weight would not have flattened it more than this blow: and he concludes from thence, that the force of the blow exceeded 200 pounds. These, to be sure, are remarkable facts, and justify a more minute consideration of a power of producing certain effects, which is so frequently and so usefully employed. But, at the same time, these are all such very vague expressions, and they do not authorise any precise conclusions from them. Mr. Camus saying "without much force," makes his pound weight, and his 200 pound weight, of no use for determining the force of the blow. He would have given more precise and applicable data for his decision, had he told us from what height the hammer should fall in order to flatten the bullet to this degree. But even then we should not have obtained any notion of the force in actual exertion during the flattening of the bullet; for the blow which could flatten the bullet in a longer or a shorter time, would unquestionably have been less or greater.

All the paradoxes, obscurities, and puzzling difficulties, in this subject, disappear, if we leave out of our consideration that unintelligible force, which is supposed to preserve a body in motion or at rest; and if we consider both of these states of body as conditions which will continue, unless some adequate cause operate a change; and if we farther grant, that such causes do really exist in the universe, however unknown their nature may be by us; and, lastly, if we acknowledge, that the phenomena of elasticity, expansiveness, cohesion, gravity, magnetism, electricity, are indications of the agency of such causes, and that their actual exertions, and the motions and changes consequent on these exertions, are so invariably connected with particular bodies, that they always accompany their appearance in certain mutual relations of distance and position:—if we proceed thus, all the phenomena of collision will be explained by these causes alone, without supposing the existence and agency of a cause distinct from them all, and incomparable with them, called the force of percussion.

For it has been sufficiently demonstrated, that that property of tangible coherent matter, which we call perfect elasticity, operates as a pressure during a certain small portion of time on both bodies, diminishing more and more the motion of the one, and augmenting that of the other, as the compression of one or both increases, till at last they separate with sensible velocities. In some very simple or perspicuous cases, we know what this pressure is in every instant of the action. We can tell how many pounds weight, at rest, will exert the same pressure. We can tell the whole duration of this pressure, and the space along which it is exerted; and, in such a case, we can say with precision what motion will be generated by this continued and varied pressure on the body which was at rest, and what diminution will be made in the motion of the other. All this can be done in the case of a ball A (fig. 7, pl. 133) moving like a pendulum with a small velocity, and striking a slender elastic hoop B, also suspended like a pendulum. We can ascertain by experiment before the collision, what pressure is neces-

sary for compressing it one inch, one-half, one-fourth, &c. Knowing this and the weight of the hoop, and the weight and velocity of the ball, we can tell every circumstance of the collision; how long the compression continues; what is the greatest compression; how far the bodies have moved while they were acting on each other; and what will be the final motion of each: in short, every thing that affords any mark or measure of a force of percussion. And we know that all this is produced by a force, familiarly known to us by the name of elasticity. Which of all these circumstances shall be called the percussion, or the force of percussion? Is it the ultimate or greatest pressure occasioned by the compression? This cannot be, because this alone will not be proportional to the final change of motion, which is generally taken as a measure of the percussion when a change of motion is its only observed effect.

We know that another perfectly elastic body, of the same weight, and struck by the same blow, and acquiring the same final velocity by the stroke, may not have sustained the tenth part of the pressure, in any one instant of the collision, if it has only been much more compressible. The greatest mutual pressure in the collision of a billiard ball is perhaps 1000 times greater than it is in a similar collision of a foot-ball of the same weight.

We also know what degree of compression will break this hoop, and what pressure will produce this compression. Therefore, should the fracture of the body be considered as the mark and measure of the percussion, we know what blow will just produce it, and be exhausted by so doing. In short, we know every mark and measure of percussion which this hoop can exhibit.

We can increase the strength of this hoop till it becomes a solid disk; and we see clearly, that in all these forms the mode of acting is the same. We see clearly, that it is the same when, instead of the solid disk, it is an elastic ball; therefore every thing that can indicate or measure the percussion of an elastic ball is explained without the operation of a peculiar force of percussion, even when the ball is shivered to pieces by the blow.

Nor is the case materially different when the bodies are soft, or imperfectly elastic. When the struck body is uniformly tenacious, it opposes a uniform resistance to penetration, and its motion will be uniformly accelerated by the action of its own tenacity during the whole time of mutual action, except a trifling variation occasioned by the mere motion of the internal parts, independent of their tenacity. If we know the weight necessary for merely penetrating this mass, and the weight and velocity of the penetrating body, we can tell how long it must be resisted by this force before its initial velocity will be annihilated, and therefore how far it will penetrate. We have tried this with deal, birch, willow, and other soft woods of uniform texture, and with nails having the body somewhat slenderer than the end, that there might not be an irregularity occasioned by a friction on the sides of the nail, continually increasing as the penetration advanced. We made the hammer fall from a considerable height, and hit the nail with great accuracy in the direction of its length, by fixing it to the end of a long lath, moveable round an axis. The results corresponded with the calculation with all the precision that could be desired.

But it does not result from all this agreement, that the force, exertion, or effect, of a blow with a hammer is equal to the pressure of any number of pounds whatever. They are things that cannot be compared; and yet the force operating in the penetration by a blow is no way different from a pressure. It is a physical blunder to compare the area of the curve, whose abscissa is the depth of penetration, and the ordinates are as the resistances, with any pressure whatever. This area expresses the square of a velocity, and its slips, bounded by parallel ordinates indefinitely near each other, are as the decrements of this square of a velocity, occasioned by a pressure, acting almost uniformly along a very small space, or during a very small time. It is an absurdity therefore to sum up these slips as so many pressures, and to consider the sum total as capable of expressing any weight whatever. Such a parallogism is peculiar to Leibnitz's way of conceiving his infinitesimal method, and it could have no place in the genuine method of fluxions. It is this misconception that has made Mr. Leibnitz and his followers suppose that a body, accelerated by gravity, retains in it a sum total of all the pressures of gravity accumulated during its fall, and now forming a *vis viva*. Supposing that it requires a pressure of twenty pounds to press a six pound shot slowly through a mass of uniformly resisting clay; this pressure would carry it from the top to the bottom of a mountain of such clay. Yet this ball, if discharged horizontally from a cannon, would penetrate only a few yards, even though the clay should resist by tenacity only, independent of the motion lost by giving motion to its internal parts. In this experiment, the utmost pressure exerted during the motion of the ball did not much exceed the pressure of twenty pounds. In this comparison, therefore, percussion, so far from appearing infinitely greater than pressure, would appear much less. But there is perhaps no body that resists penetration with perfect uniformity, even though uniformly tenacious. When the ball has penetrated to some depth, the particles which are before it cannot be so easily displaced, even although they had no tenacity, because the particles adjoining are more hemmed in by those beyond them. We have always observed, that a ball impelled by gunpowder through water rises toward the surface (having entered horizontally through the side of the vessel at some depth), and this so much the more rapidly as it entered nearer to the surface. The reason is plain. The particles which must be displaced before the ball, escape more easily upwards than in any other direction. It is for this reason chiefly that a greater weight laid on the head of a nail will cause it to sink deeper into the wood; and thus a great weight appears to be commensurable with a great force of percussion. Also while a bullet is flattening more and more under a hammer during the progress of a blow, it is spreading under the hammer; more particles are resisting at once, and they find more difficulty in effecting their escape, being harder squeezed between the hammer and the anvil. The same increased resistance must obtain while it is flattening more and more under the quiet pressure of a weight; and thus, too, a greater weight appears to be commensurable with a greater blow.

After all, however, it is true, notwithstanding that a blow given by a falling body must excite a pressure greater than its mere weight can do, and this in any degree. Thus, suppose A B (fig. 8) to represent a spiral spring in its natural unconstrained dimensions, standing upright on a table. Let $a\,b$, be the abscissa of a line $a\,d\,h\,k$, whose ordinates $e\,d$, $g\,h$, $i\,k$, &c. are as the elastic reaction of the

spring when it is compressed into the lengths *c b*, *g b*, *i b*, &c. Suppose that, when it is compressed into the form CD, it will just support the weight of a ball lying on C. Then *c d* will be a reaction equal to the weight of the ball, and the rectangle *a c d f* will express the square of the velocity which this ball would acquire by falling freely through *a c*. If therefore the ball be gently laid on the top of the spring at A, and then let go, it will descend, compressing the spring. It will not stop when the spring has acquired the form CD, which enabled it to carry the weight of the ball gently laid on it. For in this situation it has acquired a velocity, of which the square is represented by the figure *a d f*. It will compress the spring into the length *g b*, such that the area *c g h d* is equal to the area *a d f*. If the ball instead of being gently laid on A, be dropped from M, it will compress the spring into such a length *i b*, that the area, *a i k* is equal to the rectangle *m c d n*; and, if the spring cannot bear so great compression, it will be broken by this very moderate fall.

Thus we see that a blow may do things which a considerable pressure cannot accomplish. The accounts which are given of these remarkable effects of percussion, with the view of impressing notions of its great efficacy, are generally in very indefinite terms, and often without mentioning circumstances which are accessory to the effect. It would be very unfair to conclude an almost infinite power of percussion, from observing, that a particle of sand, dropped into a thick glass bottle which has not been annealed, will shiver it to pieces. When Mr. Bulfinger says that a moderate blow will break a diamond which would carry a mountain, he not only says a thing of which he cannot demonstrate the truth, and which, in all probability, is not true; but he omits noticing a circumstance which he was mechanician enough to know would have a considerable share in the effect. We mean the rapidity with which the excited pressure increases to its maximum in the case of a blow. In the experiment in question, this happens in less than the millionth part of a second, if the velocity of the hammer has been such as a man would generate in it by a very moderate exertion. For the blow which will drive a good lath nail to the head in a piece of soft deal with an ordinary carpenter's hammer, must be accounted moderate. This we have learned by experiment to be above 25 feet per second. The connecting forces exerted between the particles of the diamond may not have time sufficient for their excitation in the remote parts, so as to share the derangement among them all, in such a manner that it may be so moderate in each, as not to amount to a disunion in any part of the diamond. We see many instances of this in the abrupt handling of bodies of tender and friable texture. It is partly owing to this that a ball discharged from a pistol will go through a sheet of paper standing on edge without throwing it down, which it would certainly do if thrown at it by the hand. The connecting forces, having time to act in this last case, drag the other parts of the paper along with them, and their union is preserved. Also, when a great weight is laid on the diamond, it is gradually dimpled by it; and thus inclosing many parts together in the dimple, it obliges them to act in concert, and the derangement of each is thus diminished.

We flatter ourselves that the preceding observations and reflections will contribute somewhat towards removing the paradoxes and mysteries which discredit, in some degree, our mechanical science. If we will not pertinaciously conjure up ideal phantoms, which, perhaps, cannot exist, but content ourselves with the study of that tangible matter which the Author of Nature has presented to our view, we shall have abundant employment, and shall perceive a beautiful harmony thro' the whole of natural operations; and we shall gradually discover more and more of those mutual adaptations which enable an atom of matter, although of the same precise nature wherever it is found, to act such an unspeakable variety of parts, according to the diversity of its situations and the scene on which it is placed. If a mind be "not captivated by the harmony of such sweet sounds," we may pronounce it "dark as Erebus, and not to be trusted." (*Sup. Ency. Britan.*)

It is a celebrated proposition of Bernoulli, that in the percussion or collision of perfectly elastic bodies the sum of the products formed by multiplying each body into the square of its velocity is not altered by the impact. And Mr. Atwood has shewn that if in any system of bodies, the elastic force be to that which causes the change of figure as 854 to 1000, the sum of the products formed by multiplying each body into the *cube* of its velocity, will be the same before and after the impact. See his Analysis of a Course of Lectures, page 45, where he gives the investigation generally for any power of the velocity.

Don George Juan, a celebrated Spanish author, has given a new physico-mathematical theory of percussion; for an account of which we must refer to Gregory's Mechanics, vol. i. p. 291, 313.

Percussion (Centre of). See Centre.

PERCU'TIENT. *s.* (*percutiens*, Latin.) Striking; having the power to strike (*Bacon*).

PERDENDOSI, in music. An Italian compound signifying that the passage over which it is written is to be performed in a time gradually decreasing to the last note, and with a tone insensibly sinking on the ear till entirely lost.

PERDICIUM, in botany, a genus of the class syngenesia, order polygamia superflua. Receptacle naked; down simple; florets two-lipped. Twelve species; a few of the Cape, the rest of South America.

PERDI'TION. *s.* (*perditio*, Latin.) 1. Destruction; ruin; death (*Bacon*). 2. Loss (*Shakspeare*). 3. Eternal death (*Raleigh*).

PERDIX. See Tetrao.

PE'RDUE. *ad.* Closely; in ambush (*Hud.*).

PE'RDULOUS. *a.* (from *perdo*, Latin.) Lost; thrown away (*Bramhall*).

PE'RDURABLE. *a.* (*perdurable*, Fr.) Lasting; long continued: not in use (*Shaks.*).

PE'RDURABLY. *ad.* (from *perdurable.*) Lastingly (*Shakspeare.*)

PERDURA'TION. *s.* (*perduro*, Latin.) Long continuance (*Ainsworth*).

PERECZAS, a town of Upper Hungary, capital of a county of the same name, 50 miles E. by N. of Tockay. Lon. 22. 26 E. Lat. 48. 30 N.

PERE'GAL. *a.* (French.) Equal: obsolete (*Spenser*).

To PE'REGRINATE. *v. n.* (*peregrinus*, Latin) To travel; to live in foreign countries.

PEREGRINA'TION. *s.* (from *peregrinus*,

Latin.) Travel; abode in foreign countries (*Bentley*).

PE'REGRINE. *a.* (*peregrinus*, Latin.) Foreign; not native; not domestic (*Bacon*).

To PEREMPT. *v. a.* (*peremptus*, Latin.) To kill; to crush. A law term (*Ayliffe*).

PERE'MPTION. *s.* (*peremptio*, Latin; *peremption*, French.) Crush; extinction. Law term.

PERE'MPTORILY. *ad.* (from *peremptory*.) Absolutely; positively; so as to cut off all further debate (*Clarendon*).

PERE'MPTORINESS. *s.* (from *peremptory*.) Positiveness; absolute decision; dogmatism (*Gov. of the Tongue*).

PERE'MPTORY. *a.* (*peremptorius*, low Latin.) Dogmatical; absolute; such as destroys all further expostulation (*South*).

PERE'NNIAL. *a.* (*perennis*, Latin.) 1. Lasting through the year (*Cheyne*). 2. Perpetual; unceasing (*Harvey*).

PERE'NNITY. *s.* (from *perennitas*, Lat.) Equality of lasting through all seasons; perpetuity (*Derham*).

PE'RFECT. *a.* (*perfectus*, Latin; *parfait*, French.) 1. Complete; consummate; finished; neither defective nor redundant (*Hooker*). 2. Fully informed; fully skilful (*Shakspeare*). 3. Pure; blameless; clear; immaculate (*Sh.*). 4. Confident; certain (*Shakspeare*).

PERFECT FLOWER, in botany, having both stamen and pistil; or at least anther and stigma: the same therefore with hermaphrodite: Delin. Pl. In Philos. Botan. it is synonymous with petalodes of Tournefort. But the having a corol only is by no means sufficient to constitute perfection in a flower, according to Linnéus's idea: neither does the want of it argue imperfection.

PERFECT NUMBER, is one that is equal to the sum of all its aliquot parts when added together. Eucl. lib. 7, def. 22. As the number 6, which is $= 1 + 2 + 3$, the sum of all its aliquot parts; also 28, for $28 = 1 + 2 + 4 + 7 + 14$, the sum of all its aliquot parts. It is proved by Euclid, in the last prop. of book the 9th, that if the common geometrical series of numbers 1, 2, 4, 8, 16, 32, &c. be continued to such a number of terms, as that the sum of the said series of terms shall be a prime number, then the product of this sum by the last term of the series will be a perfect number. The first eight perfect numbers are as follow, with the factors and products which produce them:

The first perfect numbers.	Their values.
6 - - - - -	$= (2^2 - 1)\ 2$
28 - - - - -	$= (2^3 - 1)\ 2^2$
496 - - - -	$= (2^5 - 1)\ 2^4$
8128 - - - -	$= (2^7 - 1)\ 2^6$
33550336 - -	$= (2^{13} - 1)\ 2^{12}$
8589869056 - -	$= (2^{17} - 1)\ 2^{16}$
137438691328 - -	$= (2^{19} - 1)\ 2^{18}$
2305843008139952128	$= (2^{31} - 1)\ 2^{30}$

See several considerable tracts on the subject of Perfect Numbers, in the Memoirs of the Petersburgh Academy, vol. 2 of the new vols, and in several other volumes. See also Barlow's Treatise on the Properties of Numbers.

To PE'RFECT. *v. a.* (*perfectus*, from *perficio*, Latin; *parfaire*, French.) 1. To finish; to complete; to consummate; to bring to its due state (*Waller*). 2. To make skilful; to instruct fully (*Shakspeare*).

PE'RFECTER. *s.* (from *perfect*.) One that makes perfect (*Pope*).

PERFE'CTION. *s.* (*perfectio*, Latin; *perfection*, French.) 1. The state of being perfect (*Milton*). 2. Something that concurs to produce supreme excellence (*Dryden*). 3. Attribute of God (*Atterbury*).

To PERFE'CTIONATE. *v. a.* (*perfectionner*, Fr.) To make perfect; to advance to perfection: not used (*Dryden*).

PERFE'CTIVE. *a.* (from *perfect*.) Conducing to bring to perfection (*Ray*).

PERFE'CTIVELY. *ad.* In such a manner as brings to perfection (*Grew*).

PE'RFECTLY. *ad.* (from *perfect*.) 1. In the highest degree of excellence. 2. Totally; completely (*Boyle*). 3. Exactly; accurately (*Locke*).

PE'RFECTNESS. *s.* (from *perfect*.) 1. Completeness; perfection. 2. Goodness; virtue (*Colossians*). 3. Skill (*Shakspeare*).

PERFI'DIOUS. *a.* (*perfidus*, Latin; *perfide*, French.) 1. Treacherous; false to trust; guilty of violated faith (*Widow and Cat*). 2. Expressing treachery; proceeding from treachery (*Milton*).

PERFI'DIOUSLY. *ad.* Treacherously; by breach of faith (*Hudibras*).

PERFI'DIOUSNESS. *s.* (from *perfidious*.) The quality of being perfidious (*Tillotson*).

PE'RFIDY. *s.* (*perfidia*, Latin; *perfidie*, French.) Treachery; want of faith; breach of faith.

PE'RFLABLE. *a.* (from *perflo*, Latin.) Having the wind driven through.

To PE'RFLATE. *v. a.* (*perflo*, Latin.) To blow through (*Arbuthnot*).

PERFLA'TION. *s.* (from *perflate*.) The act of blowing through (*Woodward*).

PERFOLIATE LEAF. In botany, a perforated leaf. Si basis folii undique cingat transversim caulem. Philos. Bot. Basi transversim cingente (nec antice dehiscente) caulem. Having the base of the leaf entirely surrounding the stem transversely (without any opening in front). The latter clause of this explanation added in Delin. Pl. is not absolutely necessary to discriminate this from the stem-clasping leaf (amplexicaule); if the terms of the two explanations in Philos. Bot. be carefully attended to. The base of that is said to surround the sides of the stem; whereas in this, the base encircles it quite round; so that it seems as if the stem had been driven through the middle of the leaf. The perfoliate leaf is well exemplified in bupleurum rotundifolium.

After all, folium perfoliatum is perhaps an improper term, and should rather be caulis perfoliatus, a perfoliate stem.

PERFOLIATA. (from *per* and *folium*, so

called because the leaves surround the stem, like those of the cabbage.) Round-leaved hare's ear, or therow wax. This plant, bupleurum rotundifolium of Linneus, was formerly celebrated for curing ruptures, mixed into a poultice with wine and oatmeal. See BUPLEURUM.

PERFORANS. See FLEXOR PROFUNDUS PERFORANS.

PERFORATE LEAF, in botany. Full of small holes, very apparent when held up to the light. As in hypericum.

If there be any difference of meaning in the three terms perforate, pertuse, punctate; the first may be rendered pierced, the second punched, and the third dotted. In Delin. Pl. they are set down as synonymous, and are explained to be, adspersa punctis excavatis: that is, having hollow dots scattered over the surface. In Philos. Bot. we find only the term punctatum explained in the same manner. There also (p. 211.) mention is made of leaves that are dotted underneath; as in anagallis and plantago maritima.

The term perforate is applied also to a stigma having a hole bored through it.

PERFORATUS, in anatomy. See FLEXOR BREVIS DIGITORUM PEDIS, and FLEXOR SUBLIMIS PERFORATUS.

To PERFORATE. *v. a.* (*perforo*, Lat.) To pierce with a tool; to bore (*Blackmore*).

PERFORA'TION. *s.* (from *perforate.*) 1. The act of piercing or boring (*More*). 2. Hole; place bored (*Ray*).

PERFORA'TOR. *s.* (from *perforate.*) The instrument of boring (*Sharp*).

PERFO'RCE. *ad.* (*per* and *force.*) By violence; violently (*Shakspeare*).

To PERFO'RM. *v. a.* (*performare*, Ital.) To execute; to do; to discharge; to achieve an undertaking; to accomplish (*Sidney*).

To PERFO'RM. *v. n.* To succeed in an attempt (*Watts*).

PERFO'RMABLE. *a.* (from *perform.*) Practicable; such as may be done (*Brown*).

PERFO'RMANCE. *s.* (from *perform.*) 1. Completion of something designed; execution of something promised (*South*). 2. Composition; work (*Dryden*). 3. Action; something done (*Shakspeare*).

PERFO'RMER. *s.* (from *perform*). 1. One that performs any thing (*Shakspeare*). 2. It is generally applied to one that makes a public exhibition of his skill.

To PE'RFRICATE. *v. n.* (*perfrico*, Lat.) To rub over.

PERFU'MATORY. *a.* (from *perfume.*) That does perfume.

PERFU'ME. *s.* (*parfume*, French.) 1. Strong odour of sweetness used to give scents to other things (*Bacon*). 2. Sweet odour; fragrance (*Pope*).

To PERFU'ME. *v. a.* (from the noun.) To scent; to impregnate with sweet scent (*Pope*).

PERFU'MER. *s.* (from *perfume.*) One whose trade is to sell things made to gratify the scent.

PERFU'NCTORILY. *ad.* (*perfunctorié*, Latin.) Carelessly; negligently; in such a manner as to satisfy external form (*Clar.*).

PERFU'NCTORY. *a.* (*perfunctorié*, Lat.) Slight; careless; negligent (*Woodward*).

To PERFU'SE. *v. a.* (*perfusus*, Latin.) To tincture; to overspread (*Harvey*).

PERGA, a town of Turkey in Europe, in Albania, opposite the island of Corfu. Lon. 20. 19 E. Lat. 39. 40 N.

PERGAMAR, a town of Turkey in Europe, in Romania, with a bishop's see; 60 miles S.W. of Adrianople, and 65 N.W. of Gallipoli. Lon. 25. 55 E. Lat. 41. 10 N.

PERGAMO, an ancient town of Natolia, with a bishop's see, a palace, and a castle. It is not so considerable as formerly, but has nine mosques, and occupies an oblong circumference of three miles, at the foot of a mountain. Here parchment was invented. It is seated on the Germasti, 15 miles from its mouth, and 37 N. of Smyrna. Lon. 27. 27 E. Lat. 39. 5 N.

PERGAMUS, the citadel of the city of Troy. The word is often used for Troy. It was situated in the most elevated part of the town, on the shores of the river Scamander.

PERGAMUS, a town of Mysia, on the banks of the Cayeus. It was the capital of a celebrated empire called the kingdom of Pergamus, founded by Philæterus, an eunuch, whom Lysimachus, after the battle of Ipsus, had entrusted with the treasures he had obtained in the war. Philæterus made himself master of the treasures, and of Pergamus, in which they were deposited, B. C. 283, and laid the foundation of an empire, over which he himself presided for 20 years. His successors were Eumenes, Attalus, Eumenes the second, Attalus Philadelphus, and Attalus Philomator, 138, who, B. C. 133, left the Roman people heirs to his kingdom, as he had no children Parchment was first invented and made use of at Pergamus to transcribe books, as Ptolemy, king of Egypt, had forbidden the exportation of papyrus from his kingdom. From this circumstance parchment has been called charta pergamena. Galenus the physician, and Apollodorus the mythologist, were born there. Æsculapius was the chief deity of the country.

PERGULARIA, in botany, a genus of the class pentandria, order digynia. Corol twisted, salver-shaped; nectary surrounding the parts of fructification, with five arrow-shaped points. Five species; horning plants of India and the Cape.

PERGUNNAH, in the language of Hindustan, means the largest subdivision of a province, whereof the revenues are brought to one particular head cutchery, from whence the accounts and cash are transmitted to the general cutchery of the province.

PERHA'PS. *ad.* (*per* and *hap.*) Peradventure; it may be (*Smith*).

PERIA, a town of Persia, in the province of Irac, 90 miles W. of Ispahan. Lon. 51. 25 E. Lat. 32. 20 N.

PERIAC, a town of France, in the depart-

ment of Aude, celebrated for its salt-works, six miles S.W. of Narbonne.

PERIANDER, a tyrant of Corinth, son of Cypselus. The first years of his government were popular. Having consulted the tyrant of Sicily respecting the manner in which he ought to govern, he received no other answer but whatever explanation he wished to place on the tyrant's having, in the presence of his messenger, plucked in a field all the ears of corn which seemed to tower above the rest. Periander understood the meaning of this answer. He immediately put to death the richest and most powerful citizens of Corinth. He was not only cruel to his subjects, but even his family were objects of his vengeance. He committed incest with his mother, and put to death his wife Melissa, upon false accusation. He also banished his son Lycophron to the island of Corcyra, because the youth pitied the miserable end of his mother. Periander died about 585 years before the Christian era, and by the meanness of his flatterers, he was reckoned one of the seven wise men of Greece.

PERIANTH. (περι, about, and ανθος, a flower.) In botany, the calyx of a flower when contiguous to the other parts of fructification. Calyx fructificationi contiguus. In Regn. Veget. it is corollæ approximatum: but it frequently happens that a flower has a perianth without any corol. The perianth is often, but improperly, called the calyx exclusively; for this latter term has a more extensive signification. See CALYX.

Perianth of the fructification includes the stamens and germ.

Perianth of the flower contains the stamens without the germ.

Perianth of the fruit contains the germ without the stamens.

For the difference between perianth and bracte, see BRACTE.

PERIAPATAM, a town of the peninsula of Hindustan, 24 miles S.W. of Seringapatam, and 54 N.E. of Tellicherry. Lon. 76. 31 E. Lat. 12. 15 N.

PE'RIAPT. *s.* (περιαπτω.) Amulet; charm worn as preservative against diseases or mischief (*Shakspeare*).

PERIBLEPSIS. (περιβλεψις, from περιβλεπω, to stare about.) In medicine, that kind of wild look which is observed in delirious persons.

PERIBROSIS. (περιβρωσις.) An ulceration or erosion at the corners or uniting parts of the eyelids. This disorder most frequently affects the internal commissura of the eyelids. The species are, 1. Peribrosis, from the acrimony of the tears, as may be observed in the epiphora. 2. Peribrosis, from an ægylops, which sometimes extends to the commissura of the eyelids.

PERICARDITIS. (περικαρδιτις, from περικαρδιον, the pericardium.) Inflammation of the pericardium.

PERICARDIUM. (περικαρδιον, from περι, about, and καρδια, the heart.) The membraneous bag that surrounds the heart. Its use is to secrete and contain the vapour of the pericardium, which lubricates the heart, and thus preserves it from concreting with the pericardium.

PERICARPI. (περι, and καρπος, fruit or seed.) In botany, a seed-vessel or seed-case. Viscus gravidum seminibus, quæ matura dimittit. Vasculum semina producens dimittensque. Ovarium fœcundatum. Philos. Bot. 52, 56, 92. Germen defloratum seminiferum. Regn. Veg. A viscus big with seeds, or a vessel producing seeds, which it lets drop when they are ripe. Or it may be considered as the ovary or germ fecundated, or arrived to a state of maturity, after the flower is past; containing ripe seeds analogous to fruitful eggs.

The most remarkable pericarps are the capsule, silique, legume, follicle, drupe, berry, strobile.

PERICHÆTIUM. (περι, and χαιτη, juba.) In botany. Involucrum setosum, quod inter foliola basin cingit. A bristly involucre, surrounding the base, among the leaflets: in mosses.

PERICHONDRIUM. (περιχονδριον, from περι, about, and χονδρος, a cartilage.) The membrane that covers a cartilage.

PERICLES, an Athenian of a noble family, son of Xanthippus and Agariste. He, by attending the lectures of Damon, Zeno, and Anaxagoras, became a commander, a statesman, and an orator. He rendered himself popular by opposing Cimon, the favourite of the nobility, and to remove every obstacle which stood in the way of his ambition, he lessened the dignity of the court of the Areopagus. He also attacked Cimon, and caused him to be banished by the ostracism. Thucydides also, who had succeeded Cimon, shared the same fate, and Pericles remained for 15 years the absolute sovereign of the republic. Pericles did not enrich himself, but the prosperity of Athens was the object of his administration. He made war against the Lacedæmonians, and restored the temple of Delphi to the care of the Phocians. He obtained a victory over the Sicyonians near Nemæa, and waged a successful war against the inhabitants of Samos at the request of his favourite mistress Aspasia. (See ASPASIA.) The Peloponnesian war was fomented by his ambitious views (see PELOPONNESIACUM BELLUM), and when he had warmly represented the flourishing state of his country, the Athenians undertook a war against the most powerful republics of Greece, which was concluded by the destruction of their empire, and the demolition of their walls. The Athenians were at first successful, but an unfortunate expedition raised clamours against Pericles, and he was condemned to pay fifty talents, but he was again restored to all his honours, and if possible invested with more authority than before. The dreadful pestilence, however, which had diminished the number of his family, proved fatal to him, and about 420 years before Christ, in his 70th year, he fell a sacrifice to that terri-

ble malady, which robbed Athens of so many citizens. Pericles was for 40 years at the head of the administration, 25 years with others, and 15 alone. As he was expiring, and seemingly senseless, his friends that stood around his bed expatiated with warmth on the most glorious actions of his life, and the victories which he had won, when he suddenly interrupted their tears and conversation, by saying that in mentioning the exploits that he had achieved, and which were common to him with all generals, they had forgot to mention a circumstance which reflected far greater glory upon him as a minister, a general, and above all as a man. The Athenians were so pleased with his eloquence that they compared it to thunder and lightning, and as to another father of the gods, they gave him the sirname of Olympian. However great and venerable his character may be, his vicious partiality for the celebrated courtezan Aspasia justly subjected him to the ridicule and the censure of his fellow citizens.

PERICLITA'TION. *s.* (from *periclitor*, Latin.) 1. The state of being in danger. 2. Trial; experiment.

PERICONIA, in botany, a genus of the class cryptogamia, order fungi. Fungus globular; seeds sessile, deciduous, every where clothing the head and stem: one species only, an exotic liver-wort-like fungus.

PERICRANIUM. (περικρανιον, from περι, and κρανιον, the cranium.) The membrane that is closely connected to the bones of the head.

PERI'CULOUS. *a.* (*periculosus*, Latin.) Dangerous; jeopardous; hazardous (*Brown*).

PERIE'RGY. *s.* (περι and εργον.) Needless caution in an operation; unnecessary diligence.

PERIGÆUM, or PERIGEE, is that point of the orbit of the sun or moon, which is the nearest to the earth. In which sense it stands opposed to Apogé, which is the most distant point from the earth.

PERIGEE, in the ancient astronomy, denotes a point in a planet's orbit, where the centre of its epicycle is at the least distance from the earth.

PERIGEUX, an ancient town of France, capital of the department of Dordogne and late province of Perigord, with a bishop's see, the ruins of a temple of Venus, and an amphitheatre. It is seated on the river Isle, 50 miles S.W. of Limoges. Lon. 0. 48 E. Lat. 45. 11 N.

PERIGORD, a late province of France, 83 miles long and 60 broad; bounded on the N. by Angoumois and Marche, on the E. by Quierci and Limosin, on the S. by Agenois and Bazodois, and on the W. by Bourdelois, Angoumois, and Santonge. It abounds in iron-mines, and the air is pure and healthy. It now forms the department of Dordogne.

PERIGORD STONE. In mineralogy. See MAGNESIUM.

PERIHELION, PERIHELIUM, that point in the orbit of a planet or comet which is nearest to the sun. In which sense it stands opposed to Aphelion, or Aphelium, which is the highest or most distant point from the sun.

Instead of this term, the ancients used perigeum; because they placed the earth in the centre.

PE'RIL. *s.* (*peril*, Fr. *perikel*, Dutch.) 1. Danger; hazard; jeopardy (*Daniel*). 2. Denunciation; danger denounced (*Shakspeare*).

PERILLA. In botany, a genus of the class didynamia, order gymnospermia. Calyx with the upper division very short; stamens distant; styles two, united. One species; an annual of India.

PERILLUS, an ingenious artist at Athens, who made a brazen bull for Phalaris, tyrant of Agrigentum. This machine was fabricated to put criminals to death by burning them alive, and it was such that their cries were like the roaring of a bull. When Perillus give it to Phalaris, the tyrant made the first experiment upon the donor.

PE'RILOUS. *a.* (*perileux*, Fr. from *peril*.) 1. Dangerous; hazardous; full of danger. 2. It is used by way of emphasis; or ludicrous exaggeration of any thing bad (*Hudibras*). 3. Smart; witty; parlous (*Shakspeare*).

PE'RILOUSLY. *ad.* Dangerously.

PE'RILOUSNESS. *s.* Dangerousness.

PERI'METER. *s.* (περι and μετρεω.) The compass or sum of all the sides which bound any figure, whether rectilinear or mixed. In circular figures, the equivalent words are circumference and periphery; the latter is also applied to ellipses.

PERINÆUS TRANSVERSUS. In myology. See TRANSVERSUS PERINCI.

PERINÆUM. (from περινεω, to flow round, because that part is generally moist.) The space between the anus and organs of generation.

PE'RIOD. *s.* (*periode*, Fr. περιοδος.) 1. A circuit. 2. Time in which any thing is performed, so as to begin again in the same manner (*Watts*). 3. A stated number of years; a round of time, at the end of which the things comprised within the calculation shall return to the state in which they were at the beginning (*Holder*). 4. The end or conclusion (*Addison*). 5. The state at which any thing terminates (*Suckling*). 6. Length of duration (*Bacon*). 7. A complete sentence from one full stop to another (*Ben Jonson*). 8. A course of transactions memorably terminated: as, the *periods* of an empire.

To PE'RIOD. *v. a.* (from the noun.) To put an end to. A bad word (*Shakspeare*).

PERIOD. In astronomy, the time in which a star or planet makes one revolution, or returns again to the same point in the heavens.

There is a wonderful harmony between the distances of the planets from the sun, and their periods round him; the great law of which is, that the squares of the periodic times are always proportional to the cubes of their mean distances from the sun.

The periods, both tropical and sidereal,

with the proportions of the mean distances from the several planets, are already given in our treatise on astronomy.

Period, in chronology, a revolution of a certain number of years. Of these different nations and persons have adopted various. As,

Period (Calippic), a cycle of seventy-six years.

Period (Dionysian). See Victorian period.

Period (Hipparchus's), is a series or cycle of 304 solar years, returning in a constant round, and restoring the new and full moons to the same day of the solar year; as Hipparchus thought.

This period arises by multiplying the Calippic period by 4. Hipparchus assumed the quantity of the solar year to be 365d. 5h. 55m. 12 sec. and hence he concluded, that in 304 years Calippus's period would err a whole day. He therefore multiplied the period by 4, and from the product cast away an entire day. But even this does not restore the new and full moons to the same day throughout the whole period: but they are sometimes anticipated 1 d. 8 h. 23 m. 29 sec. 20 thirds.

Period (Julian), so called as being adapted to the Julian year, is a series of 7980 Julian years; arising from the multiplications of the cycles of the sun, moon, and indiction together, or the numbers 28, 19, 15; commencing on the first day of January in the 764th Julian year before the creation, and therefore is not yet completed. This comprehends all other cycles, periods, and epochs, with the times of all memorable actions and histories; and therefore it is not only the most general, but the most useful of all periods in chronology.

As every year of the Julian period has its particular solar, lunar, and indiction cycles, and no two years in it can have all these three cycles the same, every year of this period becomes accurately distinguished from another.

This period was invented by Joseph Scaliger, as containing all the other epochs, to facilitate the reduction of the years of one given epoch to those of another. It agrees with the Constantinopolitan period, used by the Greeks, except in this, that the cycles of the sun, moon, and indiction, are reckoned differently; and also in that the first year of the Constantinopolitan period differs from that of the Julian period.

Period (Metonic). See Cycle of the moon.

Period (Victorian), an interval of 532 Julian years; at the end of which, the new and full moons return again on the same day of the Julian year, according to the opinion of the inventor Victorinus, or Victorius, who lived in the time of pope Hilary.

Some ascribe this period to Dionysius Exiguus, and hence they call it the Dionysian period: others again call it the great paschal cycle, because it was invented for computing the time of Easter.

The Victorian period is produced by multiplying the solar cycle 28 by the lunar cycle 19, the product being 532. But neither does this restore the new and full moons to the same day throughout its whole duration, by 1 d. 16 h. 58 m. 59 s. 40 thirds.

PERIO'DICAL. Perio'dic. *a.* (*periodique*, French; from *period.*) 1. Circular; making a circuit; making a revolution (*Watts*). 2. Happening by revolution at some stated time (*Bentley*). 3. Regular; performing some action at stated times (*Addison*). 4. Relating to periods or revolutions (*Brown*).

PERIO'DICALLY. *ad.* (from *periodical.*) At stated periods (*Broome*).

PERIOECI, in geography, such inhabitants of the earth as have the same latitudes, but opposite longitudes; or live under the same parallel and the same meridian, but in different semicircles of that meridian, or in opposite points of the parallel. These have the same common seasons throughout the year, and the same phenomena of the heavenly bodies; but when it is noon-day with the one it is midnight with the other, there being twelve hours between them in an east or west direction. These are found on the globe, by the hour-index, or by turning the globe half round, that is 180 degrees either way.

PERIOSTEUM. (περιοςιον, from περι, about, and οςεον, a bone.) The membrane which invests the external surface of all the bones except the crowns of the teeth. It is of a fibrous texture, and well supplied with arteries, veins, nerves, and absorbents. It is called pericranium on the cranium; periorbita on the orbits; perichondrium when it covers cartilage; and peridesmium when it covers ligaments. Its use appears to be, to distribute the vessels on the external surfaces of bones.

PERIPATETICS, Περιπατητικοι, a sect of philosophers, the followers of Aristotle, or the maintainers of the Peripatetic phylosophy: called also Aristotelians.

Cicero tells us, that Plato left two excellent disciples, Xenocrates and Aristotle, who founded two sects, which only differed in name; the former taking the appellation of Academics, who were those that continued to hold their conferences in the Academy, as Plato had done before: the others, who followed Aristotle, were called Peripatetics; from περιπατεω, I walk; because they disputed walking in the Lyceum.

Ammonius fetches the name Peripatetic from Plato himself, who only taught walking; and adds, that the disciples of Aristotle, and those of Xenocrates, were equally called Peripatetics; the one Peripatetics of the academy, the other peripatetics of the lyceum: but that, at length, the former quitted the title Peripatetic, for that of Academic, on occasion of the place where they assembled: and the latter retained simply that of Peripatetic.

The greatest and best part of Aristotle's philosophy, he borrowed from his master Plato: Serranus affirms confidently, and says he is able to demonstrate it, that there is nothing exquisite in any part of Aristotle's philosophy, dialectics, ethics, politics, physics, or metaphysics, but is found in Plato. And of this opinion are many of the ancient authors, Clemens Alexandrinus, &c.

Gale endeavours to shew, that Aristotle borrowed a good deal of his philosophy, both physical, about the first matter, and metaphysical, about the first being, his affections, truth, unity, goodness, &c. from the sacred books; and adds, from Clearchus, one of his (Aristotle's) scholars, that he made use of a certain Jew, who assisted him in his undertaking.

Aristotle's philosophy preserved itself *in puris naturalibus* for a long time: in the earlier ages of Christianity, the Platonic philosophy was more generally preferred; but this did not prevent the doctrine of Aristotle from forcing its way into the Christian church. Towards the close of the fifth century, it rose into considerable credit: the Platonics, interpreting, in their schools, some of the writings of Aristotle, particularly his dialectics, and recommending them to young persons. This seems to have been the first step to that universal dominion, which Aristotle afterwards obtained among the learned, which was at the same time much promoted by the controversies which Origen had occasioned. This father was zealously attached to the Platonic system; and therefore, after his condemnation, many, to avoid the imputation of his errors, and to prevent their being counted among the number of his followers, openly adopted the philosophy of Aristotle. Nor was any philosophy more proper for furnishing those weapons of subtile distinctions and captious sophisms, which were used in the Nestorian, Arian, and Eutychian controversies. About the end of the sixth century, the Aristotelian philosophy, as well as science in general, was almost universally decried; and it was chiefly owing to Boethius, who explained and recommended it, that it obtained a higher degree of credit among the Latins than it had hitherto enjoyed. Towards the end of the seventh century, the Greeks abandoned Plato to the monks, and gave themselves up entirely to the direction of Aristotle; and in the next century, the Peripatetic philosophy was taught every where in their public schools, and propagated in all places with considerable success. John Damascenus very much contributed to its credit and influence, by composing a concise, plain, and comprehensive view of the doctrines of the Stagyrite, for the instruction of the more ignorant, and in a manner adapted to common capacities. Under the patronage of Photius, and the protection of Bardas, the study of philosophy for some time declined, but was revived again about the end of the ninth century. About the middle of the 11th century, a revolution in philosophy commenced in France; when several famous logicians, who followed Aristotle as their guide, took nevertheless the liberty of illustrating and modelling anew his philosophy, and extending it far beyond its ancient limits. In the 12th century, three methods of teaching philosophy were in use by different doctors: the first was the ancient and plain method, which confined its researches to the philosophical notions of Porphyry, and the dialectic system, commonly attributed to St. Augustine, and in which was laid down this general rule, that philosophical inquiries were to be limited to a small number of subjects, lest, by their becoming too extensive, religion might suffer by a profane mixture of human subtilty with its divine wisdom. The second method was called the Aristotelian, because it consisted in explications of the works of that philosopher, several of whose books, being translated into Latin, were almost every where in the hands of the learned. The third was termed the free method, employed by such as were bold enough to search after truth, in the manner the most adapted to render their inquiries successful, without rejecting the succours of Aristotle and Plato. A reformed system of the Peripatetic philosophy was first introduced into the schools in the university of Paris, from whence it soon spread throughout Europe, and has subsisted in some universities even to this day, under the name school philosophy. The foundation thereof is Aristotle's doctrine, often misunderstood, but oftener misapplied: whence the retainers thereto may be denominated reformed Peripatetics. Out of these have sprung, at various times, several branches: the chief are, the THOMISTS, SCOTISTS, and NOMINALISTS. See those articles.

On several of the topics treated by Aristotle, he was extremely vague and unsatisfactory, while on some few he was remarkably clear and luminous. Thus in his discussions on politics he states, in few words, the only legitimate purpose of political establishments. "Every political society (says he) forms, it is plain, a sort of community or partnership, instituted for the benefit of the partners. Utility is the end and aim of every such institution; and the greatest and most extensive utility is the aim of that great association comprehending all the rest, and known by the name of the commonwealth." Having stated and explained the grand purposes of society, he considers the best systems of means for attaining those purposes, and traces the distinction of ranks which arises from the inequalities of individual talents, virtue, and fortune. Political institutions are best fitted for promoting human happiness, when they are most suitable to the opinions and sentiments of the people, and the circumstances of the times and country. No one political system will equally suit all situations, and scarcely any two. Government being an arrangement, the best government must be the best arrangement, and the best arrangement is that in which the materials to be arranged are the best fitted both to receive and to preserve. The materials of the statesman or legislator are the number and character of his people, and the extent and quality of his country. The excellence of a commonwealth, however, is not to be estimated by its populousness or extent, but by its fitness for performing its proper functions; the same energies and habits constitute the happiness both of individuals and of nations. Men make governments, not governments them; nor by any system of political arrangements can a happy commonwealth be constituted from

fools or cowards, profligates or knaves. The bricks must be first prepared before the edifice can be reared. The human character is a compound of good and evil; the former arises from the balance of the affections, under the control and guidance of reason, the latter results from passion operating without restraint. That government is the best which most powerfully stimulates the energies of the people to beneficial purposes, and restrains them from hurtful pursuits. That must be a system of freedom, in the first place tempered by order, and moderation in the second. Mixed governments, wisely formed and balanced, best correspond to the state of mankind. Democracy, though apparently most agreeable to the rights of man, is not the best adapted to his wants; the general will, unrestrained, is apt to run into excess; to be precipitate in deliberation, and tardy in execution. While simple democracy is inexpedient for the people themselves, simple aristocracy and simple monarchy are equally inexpedient. The peripatetic system, after having prevailed with great and extensive dominion for many centuries, began rapidly to decline towards the close of the 17th, when the disciples of Ramus attacked it. It had also a succession of most formidable enemies in Galileo, Bacon, Descartes, Gassendi, Barrow, Newton, &c.

PERI'PHERY. *s.* (περι and φερω.) Circumference (*Harvey*).

To PERI'PHRASE. *v. a.* (*periphraser*, Fr.) To express one word by many; to express by circumlocution.

PERI'PHRASIS. *s.* (περιφρασις; *periphrase*, Fr.) Circumlocution; use of many words to express the sense of one (*Watts*).

PERIPHRA'STICAL. *a.* (from *periphrasis.*) Circumlocutory; expressing the sense of one word in many.

PERIPLOCA. Virginian silk. In botany, a genus of the class pentandria, order digynia. Corol twisted; nectary surrounding the parts of fructification, putting forth five threads. Thirteen species, chiefly Asiatic plants; a few of the Cape. The following are cultivated.

1. P. Græca. Common Virginian silk. Stem shrubby, clasping any support, more than forty feet high, covered with a dark bark, and sending out slender branches which twine round each other; leaves ovate-lanceolate, near four inches long, two broad in the middle, pedicelled, lucid green above, pale below; flowers terminal, in bunches, of a purple colour. A native of Syria, flowering in July and August, but rarely ripening its seeds in this country.

2. P. secamone. Green periploca.

3. P. Indica. Indian periploca.

4. P. Africana. African periploca.

The first sort often succeeds by cuttings, and is the only one that will bear the open air of this country. They may all be obtained by sowing their seeds procured from abroad, in pots of light earth plunged into a hot-bed. All of them require props, to prevent their trailing on the ground and fastening about other plants.

PERIPNEUMONIA. (*peripneumonia*, περιπνευμονια, from περι, and πνευμων, the lung.) Peripneumony, or inflammation of the lungs. See PNEUMONIA.

PERIPNEUMONIA NOTHA. Bastard or spurious peripneumony. Practitioners, it would appear, do not all affix this name to the same disease; some affirming it is a rheumatic affection of the respiratory muscles, while others consider it as a mild peripneumony. It is characterised by difficulty of breathing, great oppression at the chest, with obscure pains, cough, and occasionally an expectoration.

PERISCII, in geography, the inhabitants of either frigid zone, between the polar circles and the poles, where the sun, when in the summer signs, moves only round about them, without setting; and consequently their shadows in the same day turn to all the points of the horizon.

To PE'RISH. *v. n.* (*perir*, Fr. *pereo*, Latin.) 1. To die; to be destroyed; to be lost; to come to nothing (*Locke*). 2. To be in a perpetual state of decay (*Locke*). 3. To be lost eternally (*Moreton*).

To PE'RISH. *v. a.* To destroy; to decay: not in use (*Collier*).

PE'RISHABLE. *a.* (from *perish.*) Liable to perish; subject to decay; of short duration.

PE'RISHABLENESS. *s.* Liableness to be destroyed; liableness to decay (*Locke*).

PERISTALTIC MOTION. (*peristalticus*, περισαλτικος, from περιστελλω, to contract.) The vermicular motion of the intestines, by which they contract and propel their contents. A similar motion takes place in the Fallopian tubes, after conception, by means of which the ovum is translated from the ovarium into the uterus.

PERISTERIUM. (*peristerium*, περισεριον, from περισερον, a pigeon, so called because pigeons cover it.) The herb vervain. See VERBENA.

PERISTYLE, in ancient architecture, a building encompassed with a row of columns on the inside.

PERISYSTOLE. (*perisystole*, περισυσολη, from περισελλω, to compress.) The intermission or time between the contraction and dilatation of the heart.

PERITONÆUM. (*peritonæum*, περιτοναιον, from περιτεινω, to extend round.) A strong simple membrane, by which all the viscera of the abdomen are surrounded. It has an exceedingly smooth, exhaling, and moist internal surface. Outwardly, it is every where surrounded by cellular substance, which, towards the kidneys, is very loose and very fat; but is very short at the lower tendon of the transverse muscles. It begins from the diaphragm, which it completely lines; and, at the last fleshy fibres of the ribs, and the external lumbar fibres, it completes the septum, in conjunction with the pleura, with which it is continuous through the various intervals of the diaphragm. Posteriorly it descends before the kidneys; anteriorly, behind the abdominal muscles; it dips into the pelvis; from the bones of the

pubis, passes over the bladder, and descends behind; and being again carried backwards at the entrance of the ureters in two lunar folds, it rejoins upon the intestinum rectum, that part of itself which invests the loins, and in this situation lies before the rectum. The cellular texture, which covers the peritonæum on the outside, is continued into sheaths in very many places; of which one receives the testicles on each side, another the iliac vessels of the pelvis, viz. the obturatoria, those of the penis, bladder, and aorta, and, ascending to the breast, accompany the œsophagus and vertebræ; by means of which, there is a communication between the whole body and the peritonæum, well known in dropsical people. It has various prolongations, for covering the viscera. The shorter productions of this membrane are called ligaments; and are formed by a continuous reduplication of the peritonæum, receding from its inner surface, inclosing cellular substance, and extending to some viscus, where its plates separate, and, having diverged, embrace the viscus; but the intermediate cellular substance always accompanies this membranaceous coat, and joins it with the true substance of the viscus. Of this short kind of production, three belong to the liver, one or two to the spleen, and others to the kidneys, and to the sides of the uterus and vagina. By this means, the tender substance of the viscera is defended from injury by any motion or concussion, and their whole mass is prevented from being misplaced by their own weight, and from injuring themselves, being securely connected with the firm sides of the peritonæum.

PERITONITIS. (*peritonitis*, περιτονιτις, from περιτοναιον, the peritonæum.) An inflammation of the peritonæum. A genus of disease in the class pyrexiæ and order phlegmasiæ of Cullen, known by the presence of pyrexia, with pain in the abdomen, that is increased when in an erect position. When the inflammation attacks the peritoneum of the viscera, it takes the name of the viscus: thus, peritonitis hepatis, peritonitis intestinalis, peritonitis omentalis, or epiploitis, or omentalis, peritonitis mesenterii.

PERITROCHIUM, in mechanics, a wheel or circle, concentric with a cylinder, and moveable together with it about its axis. See AXIS and AXLE.

PE'RJURE. *s.* (*perjurus*, Latin.) A perjured or forsworn person: not in use (*Shakspeare*).

To PE'RJURE. *v. a.* (*perjuro*, Latin.) To forswear; to taint with perjury (*Shaks.*).

PERJURER. *s.* (from *perjure.*) One that swears falsely (*Spenser*).

PE'RJURY. *s.* (*perjurium*, Latin.) False oath. See OATH.

PE'RIWIG. *s.* (*perruque*, French.) Adsciti- different ... hair not natural, worn by way of plain method, concealment of baldness (*Swift*). the philosophi-WIG. *v. a.* (from the noun.) To dialectic syste hair (*Swift*).

Augustine, a NKLE, in botany. See VINCA.

PERIWINKLE, in helminthology. See TURBO.

PERIZONIUS (James), a learned writer, who lived in the beginning of the last century. The name of his family, originally of Teutorp in Westphalia, was Voorbroek; but he changed it for the more classical one of Perizonius. He published, in 1669, the learned treatise De Ratione studii Thelogici, after having been professor of divinity and the oriental languages both at Ham and Deventer. He died in 1717.

PERIZZITES, the ancient inhabitants of Palestine, mingled with the Canaanites. There is also a great probability that they themselves were Canaanites; but having no fixed habitations, sometimes dispersed in one country and sometimes in another, they were for that reason called Perizzites, which signifies scattered or dispersed. Pherazoth stands for hamlets or villages. The Perizzites did not inhabit any certain portion of the land of Canaan; there were some of them on both sides the river Jordan, in the mountains, and in the plains. In several places of scripture the Canaanites and Perizzites are mentioned as the two chief people of the country.

To PERK. *v. n.* (from *perch*, *Skinner.*) To hold up the head with an affected briskness.

To PERK. *v. a.* To dress; to prank (*Shakspeare*).

PERK. *a.* Pert; brisk; airy: obsolete (*Spenser*).

PE'RLOUS. *a.* (from *perilous.*) Dangerous; full of hazard (*Spenser*).

PERLEBERG, a town of Brandenburgh, capital of the mark of Pregnitz. It has considerable cloth manufactures, and stands on the Stepenitz, 42 miles W.N.W. of Ruppin. Lon. 12 3 E. Lat. 53. 8 N.

PERM, a government of Russia, formerly a province of Kasan. It is divided into two provinces, Perm, and Catharinenburg, the capitals of which are of the same name.

PERM, a town of Russia, capital of a government and province of the same name. It is seated on the Kama, at the influx of the Zegochekha, 620 miles E. by N. of Moscow, and 810 E. by S. of Petersburg. Lon. 55 10 E. Lat. 57. 55 N.

PE'RMAGY. *s.* A little Turkish boat.

PE'RMANENCE. PE'RMANENCY. *s.* (from *permanent.*) 1. Duration; consistency; continuance in the same state; lastingness (*Hale*). 2. Continuance in rest (*Bentley*).

PE'RMANENT. *a.* (*permanens*, Latin.) 1. Durable; not decaying; unchanged (*Hooker*). 2. Of long continuance (*Kettlewell*).

PERMANENT, in botany, a term applied to leaves that remain on the plant till the fruit is ripe or after the summer is over.—To stipules continuing after the leaves drop off; as in the class diadelphia, and the order polygynia of class icosandria.—To calyxes, abiding after the corol is withered; as in the class didynamia.

PE'RMANENTLY. *ad.* (from *permanent.*) Durably; lastingly (*Boyle*).

PERMANSION. *s.* (from *permaneo*, Lat.) Continuance (*Brown*).

PE'RMEABLE. *a.* (from *permeo*, Latin.) Such as may be passed through (*Boyle*).

PE'RMEANT. *a.* (*permeans*, Latin.) Passing through (*Brown*).

To PE'RMEATE. *v. a.* (*permeo*, Latin.) To pass through (*Woodward*).

PERMEA'TION. *s.* (from *permeate*.) The act of passing through.

PERMI'SCIBLE. *a.* (from *permisceo*, Lat.) Such as may be mingled.

PERMI'SSIBLE. *a.* (*permissus*, Latin.) What may be permitted.

PERMI'SSION. *s.* (*permission*, Fr. *permissus*, Latin.) Allowance; grant of liberty (*Milton*).

PERMI'SSIVE. *a.* (from *permitto*, Latin.) 1. Granting liberty, not favour; not hindering, though not approving (*Milton*). 2. Granted; suffered without hinderance; not authorized or favoured (*Milton*).

PERMI'SSIVELY. *ad.* By bare allowance; without hinderance (*Bacon*).

PERMI'STION. *s.* (*permistus*, Latin.) The act of mixing.

To PERMI'T. *v. a.* (*permitto*, Latin.) 1. To allow without command (*Hooker*). 2. To suffer without authorizing or approving. 3. To allow; to suffer (*Locke*). 4. To give up; to resign (*Dryden*).

PE'RMIT. *s.* A written permission from an officer for transporting goods from place to place, shewing the duty on them to have been paid.

PERMI'TTANCE. *s.* (from *permit*.) Allowance; permission. A bad word (*Derham*).

PERMI'XTION. *s.* (from *permistus*, Lat.) The act of mingling; the state of being mingled (*Brerewood*).

PERMUTA'TION. *s.* (*permutation*, Fr. *permutatio*, Latin.) Exchange of one for another (*Ray*).

PERMUTATION, in arithmetic. See ALTERNATION.

To PERMU'TE. *v. a.* (*permuto*, Latin; *permuter*, Fr.) To exchange.

PERMU'TER. *s.* (*permutant*, French.) An exchanger; he who permutes.

PERNAU, a fortified town of Russia, in Livonia, with a castle; seated near the mouth of a river of the same name, 95 miles N. of Riga. Lon. 24. 30 E. Lat. 58. 30 N.

PERNI'CIOUS. *a.* (*perniciosus*, Latin.) 1. Mischievous in the highest degree; destructive (*Shakspeare*). 2. (*pernix*, Latin.) Quick: not used (*Milton*).

PERNI'CIOUSLY. *ad.* Destructively; mischievously; ruinously (*Shakspeare*).

PERNI'CIOUSNESS. *s.* (from *pernicious*.) The quality of being pernicious.

PERNI'CITY. *s.* (from *pernix*.) Swiftness; celerity (*Ray*).

PERNIO. (*pernio*.) A chilblain. A species of erythema of Cullen.

PEROLA, in botany. See MOMORDICA.

PERONEUS ANTICUS, in anatomy. See PERONEUS BREVIS.

PERONEUS BREVIS. (*peroneus musculus*, περοναιος, from *perone*, the fibula.) This muscle, which is in a great measure covered by the last described muscle, is the peroneus secundus seu anticus of Douglas, and the peroneus medius seu anticus of Winslow. It arises by an acute, thin, and fleshy origin from the anterior and outer part of the fibula, its fibres continuing to adhere to the lower half of that bone. Its round tendon passes through the groove in the malleolus externus, along with that of the peroneus longus, after which it runs in a separate groove to be inserted into the upper and posterior part of the tubercle at the basis of the metatarsal bone, that supports the little toe. Its use is to assist the peroneus longus.

PERONEUS LONGUS. This muscle, which is the peroneus primus seu posticus of Douglas, and the peroneus maximus seu posterior of Winslow, is situated somewhat anteriorly along the outer side of the leg. It arises tendinous and fleshy from the external lateral part of the head of the tibia, and likewise from the upper anterior surface and outer side of the perone or fibula, its fibres continuing to adhere to the outer surface of the latter to within three or four inches of the malleolus externus. It terminates in a long round tendon, which runs obliquely behind the malleolus internus, where it passes through a cartilaginous groove in common with the peroneus brevis, being bound down by an annular ligament. When it has reached the os calcis, it quits the tendon of the peroneus brevis, and runs obliquely inwards along a groove in the os cuboides, under the muscles on the sole of the foot, to be inserted into the outside of the posterior extremity of the metatarsal bone that supports the great toe. Near the insertion of this muscle we find a small bursa mucosa. This muscle draws the foot outwards, and likewise assists in extending it.

PERONEUS MAXIMUS. See PERONEUS LONGUS.

PERONEUS MEDIUS. See PERONEUS BREVIS.

PERONEUS POSTICUS. See PERONEUS LONGUS.

PERONEUS PRIMUS. See PERONEUS LONGUS.

PERONEUS TERTIUS. This is the name given by Albinus to a muscle which, by some writers, is called nonus Vesalii, or Vesalius's ninth muscle of the foot; but by most considered in the present day as a portion of the extensor longus digitorum pedis. It is situated at the anterior, inferior, and outer part of the leg, along the outer edge of the last described muscle, to which it is intimately united. It arises fleshy from the anterior surface of the lower half of the fibula, and from the adjacent part of the interosseous ligament. Its fibres run obliquely downwards, towards a tendon which passes under the annular ligament, and then running obliquely outwards, is insert-

ed into the root of the metatarsal bone that supports the little toe.

This muscle assists in bending the foot.

PERONEUS SECUNDUS. See PERONEUS BREVIS.

PERONES, in antiquity, a kind of high-shoes worn by men of ordinary rank in Rome.

PERONNE, a strong town of France, in the department of Somme. It is called Pucelle, because it has never been taken, though often besieged. The castle was the imprisonment of Charles the simple, who here miserably died; and in this castle the duke of Burgundy detained Lewis XI. three days, till he consented to sign a disadvantageous treaty. It is seated on the Somme, 27 miles S W. of Cambray, and 80 E. by N. of Paris. Lon. 3. 2 E. Lat. 49. 55 N.

PERORATION, *peroratio*, in rhetoric, the epilogue, or last part, of an oration; wherein what the orator had insisted on through his whole discourse is urged afresh, with greater vehemence and passion.

The peroration consists of two parts: 1. Recapitulation, wherein the substance of what was diffused throughout the whole speech is collected briefly and cursorily, and summed up with new force and weight.

2. The moving the passions; which is so peculiar to the peroration, that the masters of the art call this part *sedes affectuum*.

PEROTIS, in botany, a genus of the class triandria, order digynia. Calyxless; corol two-valved, the valves equal, awned, invested on the outside with very long wool. Three species, Indian grasses with flowers in thin spikes; florets pedicelled and purplish.

PEROUSE (John Francis Galoup de la), the celebrated, though unfortunate, French navigator, was born at Albi in 1741. Of the rank or condition of his father, M. Milet-Mureau has given us no information in that meagre eulogy of Perouse which he has inserted in the introduction to his last voyage. It appears, however, that he intended to make his son a seaman, and sent him, at a very early period of life, to the marine school, where the young man became enthusiastically fond of his profession, and laudably ambitious to emulate the fame of the most celebrated navigators.

Being appointed a midshipman on the 19th of November 1756, he behaved, we are told, with great bravery in that station, and was severely wounded in the engagement between the admirals Hawke and Conflans, on the 20th of November 1759. The Formidable, in which he served, was taken, after a vigorous resistance; and it is probable that Perouse reaped some advantage from his acquaintance with British officers.

On the 1st of October 1764 he was promoted to the rank of lieutenant; and despising a life of ease and idleness, he contrived to be employed in six different ships of war during the peace that subsisted between Great Britain and France. In 1767 he was promoted to the rank of what, in our navy, is called master and commander. In 1779 he commanded the Amazone, belonging to the squadron of vice-admiral count d'Estaing; and when that officer engaged admiral Byron, the post of La Perouse was to carry his admiral's orders to the whole of the line. He afterwards took the sloop Ariel, and contributed to the capture of the Experiment—exploits which his eulogist seems to consider as instances of very uncommon heroism; but he soon after performed a greater.

Being, on the 4th of April, 1780, appointed captain of the frigate Astrea, and being on a cruise with the Hermione, these two frigates attacked six English vessels of war, of from 28 to 14 guns each, and took two of them. The French certainly reaped more laurels about that period than they have been accustomed to do in naval wars with Great Britain; but as we have completely forgotten the particulars of this fight, we suspect that it was not altogether so very brilliant a business as M. Milet-Mureau is pleased to represent it

In the year 1782, La Perouse was dispatched with the Sceptre of 74 guns, and two frigates of 36 guns each, having some troops and field pieces on board, to destroy the English settlements in Hudson's Bay. This task was easily accomplished; for when he had surmounted the difficulties of navigation in a frozen sea, he found nothing on shore to oppose the smallest force. Having destroyed the settlements, he learned that some of the English had fled at his approach into the woods; and his eulogist considers it (such are the dispositions of French republicans) as a most wonderful instance of humanity, that he left to these unfortunate men provisions to preserve them from perishing by hunger, and arms to protect them from the fury of the savages! Perouse, we dare answer for him, was conscious of nothing heroic or extraordinary in this act of beneficence, which he certainly could not have omitted, without incurring both infamy and guilt.

In the year 1785, he was appointed to the command of a voyage round the world; which was unfortunately destined to be his last. Of this voyage, as far as it was accomplished, there is a full account in the hands of every French and English reader; and from that account it appears, that Perouse was admirably qualified to discharge such a trust. He seems to have been an experienced and skilful seaman; a man of considerable mathematical and physical science, uncorrupted by that philosophism which disgraced many of his attendants; and capable of the utmost perseverance in every laudable pursuit. To these qualities he united a proper combination of caution and courage, with a disposition truly benevolent to the various tribes of savages whom he visited. The disasters which occurred on the voyage were all, except the last, of which nothing is known, occasioned by the disobedience of his officers, or their neglecting to follow his advice.

The last dispatches of this great and good man were dated from Botany Bay, February the 7th, 1788; and since that period, no account of him has been received which is inti-

tled to the smallest confidence. Of course the place and time of his death are unknown.

To PERPE'ND. *v. a.* (*perpendo*, Lat.) To weigh in the mind; to consider attentively (*Shakspeare*).

PERPE'NDER. *s.* (*perpigne*, Fr.) A coping stone.

PE'RPENDICLE. *s.* (*perpendicule*, Fr. *perpendiculum*, Lat.) Any thing hanging down by a straight line.

PERPENDI'CULAR *a.* (*perpendiculaire*, Fr. *perpendicularis*, Latin.) 1. Crossing any other line at right angles (*Newton*). 2. Cutting the horizon at right angles (*Brown*).

Perpendicular, in geometry, a line standing upon another line, so as to make equal angles on each side, or a right angle on either side.

Perpendicular of a conic section or curve. See Curve and Normal.

Perpendicular, in gunnery, is a small instrument, used for finding the centre line of a piece in the operation of pointing it to a given object.

PERPENDI'CULARLY. *ad.* 1. In such a manner as to cut another line at right angles. 2. In the direction of a straight line up and down (*More*).

PERPENDICULA'RITY. *s.* (from *perpendicular.*) The state of being perpendicular (*Watts*).

PERPE'NSION. *s.* (from *perpend.*) Consideration: not in use (*Brown*).

To PE'RPETRATE. *v. a.* (*perpetro*, Lat.) To commit; to act. Always in an ill sense.

PERPETRA'TION. *s.* (from *perpetrate.*) 1. The act of committing a crime (*Wotton*). 2. A bad action (*King Charles*).

PERPE'TUAL. *a.* (*perpetuel*, Fr. *perpetuus*, Latin.) 1. Never ceasing; eternal with respect to futurity (*Dryden*). 2. Continual; uninterrupted; perennial (*Arbuthnot*). 3. Perpetual screw. A screw which acts against the teeth of a wheel, and continues its action without end (*Wilkins*).

PERPE'TUALLY. *ad.* (from *perpetual.*) Constantly; continually; incessantly (*Newton*).

To PERPE'TUATE. *v. a.* (*perpetuo*, Lat.) 1. To make perpetual; to preserve from extinction; to eternize (*Addison*). 2. To continue without cessation or intermission (*Hammond*).

PERPETUA'TION. *s.* (from *perpetuate.*) The act of making perpetual; incessant continuance (*Brown*).

PERPETU'ITY. *s.* (*perpetuitas*, Latin.) 1. Duration to all futurity (*Hooker*). 2. Exemption from intermission or cessation (*Holder*). 3. Something of which there is no end (*Pope*).

Perpetuity, in the doctrine of annuities, is the number of years in which the simple interest of any principal sum will amount to the same as the principal itself; or it is the number of years' purchase to be given for an annuity which is to continue for ever; and it is found by dividing 100l. by the rate of interest agreed upon; thus allowing 5 per cent, the perpetuity is $L.\frac{100}{5}=20$; and at the rates usually adopted, the perpetuity is as follows:

At 3 per cent. $\frac{100}{3}=33.333$, &c.

$3\frac{1}{2}$...... $\frac{100}{3.5}=28.57$, &c.

4...... $\frac{100}{4}=25$.

$4\frac{1}{2}$...... $\frac{100}{4.5}=22.22$, &c.

5...... $\frac{100}{5}=20$.

6...... $\frac{100}{6}=16.66$, &c.

7...... $\frac{100}{7}=14.28$, &c.

8...... $\frac{100}{8}=12.5$.

These are the number of years purchase to be given for a perpetual annuity, on the supposition that it is receiveable yearly.

Perpetuity, in law, is where, if all that have interest join in the conveyance, yet they cannot bar or pass the estate; for, if by concurrence of all having interest, the estate may be barred, it is no perpetuity

PERPIGNAN, a fortified town of France, capital of the department of Eastern Pyrenees, with a good citadel and a university. It was lately a bishop's see, and is seated on the Tet, near the Mediterranean, 95 miles S.E. of Toulouse. Lon. 2. 54 E. Lat. 42. 42 N.

To PERPLE'X. *v. a.* (*perplexus*, Latin.) 1. To disturb with doubtful notions; to entangle; to make anxious; to tease with suspence or ambiguity; to distract (*Dryden*). 2. To make intricate; to involve; to complicate (*Addison*). 3. To plague; to vex: not used (*Granville*).

Perple'x. *a.* (*perplex*, Fr. *perplexus*, Lat.) Intricate; difficult. *Perplexed* is the word in use (*Granville*).

PERPLE'XEDLY. *ad.* (from *perplexed.*) Intricately; with involution.

PERPLE'XEDNESS. *s.* (from *perplexed.*) 1. Embarrassment; anxiety. 2. Intricacy; involution; difficulty (*Locke*).

PERPLE'XITY. *s.* (*perplexité*, Fr.) 1. Anxiety; distraction of mind (*Spenser*). 2. Entanglement; intricacy (*Stillingfleet*).

PERPOTA'TION. *s.* (*per* and *poto*, Lat.) The act of drinking largely.

PE'RQUISITE. *s.* (*perquisitus*, Lat.) Something gained by a place or office over and above the settled wages (*Addison*).

PE'RQUISITED. *a.* (from *perquisite.*) Supplied with perquisites (*Savage*).

PERQUISI'TION. *s.* (*perquisitus*, Latin.) An accurate inquiry; a thorough search (*Ainsworth*).

PERRON (James Davy Du), a cardinal distinguished by his abilities and learning, was born in the canton of Bern in 1556. He was

educated by Julian Davy, his father, a very learned Calvinist, who taught him Latin and the mathematics; after which, he by himself became acquainted with the Greek and Hebrew, philosophy and the poets. Philip Desportes, abbot of Tyron, made him known to Henry III. king of France, who conceived a great esteem for him. Some time after, Du Perron abjured Calvinism, and afterwards embraced the ecclesiastical function; and having given great proofs of his wit and learning, he was chosen to pronounce the funeral oration of Mary queen of Scots. After the murder of Henry III. he retired to the house of cardinal de Bourbon, and took great pains in bringing back the protestants to the church of Rome. Among others, he gained over Henry Spondanus, afterwards bishop of Pamiers. He also chiefly contributed to engage Henry IV. to change his religion; and that prince sent him to negotiate his reconciliation to the holy see, in which he succeeded. Du Perron was consecrated bishop of Evreux while he resided at Rome. On his return to France, he wrote, preached, and disputed against the reformed; particularly against Du Plessis Mornay, with whom he had a public conference in the presence of the king at Fontainbleau. He was made cardinal in 1604 by pope Clement VIII. at the solicitation of Henry IV. who afterwards nominated him to the archbishopric of Sens. The king at length sent him to Rome with cardinal Joyeuse, in order to terminate the disputes which had arisen between Paul V. and the Venetians. It is said that this pope had such an high opinion of the address of the cardinal Du Perron, that he used to say, "Let us pray to God to inspire the cardinal Du Perron, for he will persuade us to do whatever he pleases." After the death of Henry IV. he retired into the country, where he put the last hand to his works; and, setting up a printing-house, corrected every sheet himself. He died at Paris in 1618. His works were collected after his death, and published at Paris in 3 vols. folio.

PERRONET (John Rodolphus), rose by his merit to the office of director general of bridges and roads in France. He was for his services rewarded with the order of St. Michael, and became inspector, and afterwards director of the school of engineers at Paris. The bridges of Neuilly, Nantes, Orleans, &c. were constructed under his direction, and the public roads of the kingdom were improved by his plans. He died 1794, aged 86. He published a very curious and valuable description of the bridges which he had erected, 2 vols. folio—memoirs on the method of constructing grand arches of stone from 200 to 500 feet, over vallies, 4to. &c.

PERROT (Nicholas), Sieur d'Ablancourt, one of the first geniuses of his age, was born at Chalons in 1606. After studying philosophy about three years, he was sent to Paris to follow the law. At eighteen years of age he was admitted advocate of parliament, and frequented the bar; but he soon conceived a distaste for it, and therefore discontinued his practice. This displeased an uncle, but whose favour he recovered by quitting the protestant religion. He could not, however, be prevailed upon to take orders in the Romish church; and some years after, he had a desire to return to the religion he had abjured. But, that he might not do any thing rashly, he resolved to study philosophy and divinity. For that purpose he chose for his master Mr. Stuart, a Scotsman and Lutheran, a man of great learning. Almost three years he spent in the most assiduous study; and then set out from Paris to Champagne, where he abjured the Roman catholic, and once more embraced the protestant religion. In 1637 he was admitted a member of the French academy; a little after which, he undertook a translation of Tacitus. Whilst he was engaged in that laborious task, he retired to his small estate of Ablancourt, and lived there till his death in 1664. He was a man of fine understanding, of great piety and integrity, and of universal learning. Moreri has given a catalogue of his works, the greatest part of which consist of translations, which seemed rather originals.

PERRUKE, Peruke, or Periwig, was anciently a name for a long head of natural hair; such, particularly, as there was care taken in the adjusting and trimming of. Menage derives the word very fancifully from the Latin *pilus*, hair. It is derived, according to this critic, thus: *pilus, pelus, pelutus, peluticus, pelutica, perutica, peruca, perruque*.

PERRY, a drink made from pears in the same manner that cyder is from apples. See Cyder.

PER SE, in the schools, is sometimes opposed to *per accidens*. In which sense, a thing is said to agree with another *per se*, when the agreement is not owing to any accidental event, but is found in the intrinsic principles of things themselves.

Per se is sometimes also opposed to *per aliud*. In which sense, God alone is said to have a being *per se*, as not deriving it from any other, but having it necessarily, and of himself.

Per se, again, sometimes signifies as much as, of its own nature, or in virtue of its own entity. Thus the sun is said to give light *per se*; and thus quantity is extended *per se*.

Per se, among logicians. A thing is said to be known *per se, per se notum*, when we immediately perceive it upon the first proposing of the terms. As, that the whole is greater than its parts.

PERSEA, in botany. See Laurus.

To PE'RSECUTE. *v. a.* (*persecuter*, Fr. *persecutus*, Latin.) 1. To harass with penalties; to pursue with malignity (*Acts*). 2. To pursue with repeated acts of vengeance or enmity (*Dryden*). 3. To importune much.

PERSECU'TION. *s.* (*persecution*, Fr. *persecutio*, Latin.) 1. The act or practice of persecuting (*Addison*). 2. The state of being persecuted (*Sprat*).

PERSECUTION, is any pain or affliction which a person designedly inflicts upon another; and in a more restrained sense the sufferings of Christians on account of their religion. Historians usually reckon ten general persecutions, the first of which was under the emperor Nero, 31 years after our Lord's ascension; when that emperor, having set fire to the city of Rome, threw the odium of that execrable action on the Christians, who under that pretence were wrapped up in the skins of wild beasts, and worried and devoured by dogs; others were crucified, and others burnt alive. The second was under Domitian, in the year 95. In this persecution St. John the apostle was sent to the isle of Patmos, in order to be employed in digging in the mines. The third began in the third year of Trajan, in the year 100, and was carried on with great violence for several years. The fourth was under Antoninus the philosopher, when the Christians were banished from their houses, forbidden to show their heads, reproached, beaten, hurried from place to place, plundered, imprisoned, and stoned. The fifth began in the year 197, under the emperor Severus. The sixth began with the reign of the emperor Maximinus in 235. The seventh, which was the most dreadful persecution that had ever been known in the church, began in the year 250, in the reign of the emperor Decius, when the Christians were in all places driven from their habitations, stripped of their estates, tormented with racks, &c. The eighth began in the year 257, in the fourth year of the reign of the emperor Valerian. The ninth was under the emperor Aurelian, A.D. 274; but this was very inconsiderable; and the tenth began in the 19th year of Dioclesian, A. D. 303. In this dreadful persecution, which lasted ten years, houses filled with Christians were set on fire, and whole droves were tied together with ropes and thrown into the sea. Hence, pillars were erected in Spain in honour of Dioclesian, for having "every where abolished the superstition of Christ;" and a medal of this emperor, still extant, was struck with the inscription, "*Nomine Christianorum deleto.*" See Milner's Church History, vol. ii. p. 6, 7; and Gregory's Letters on the Evidences, Doctrines, and Duties of the Christian Religion, vol. i. p. 245.

PE'RSECUTOR. *s.* (*persecuteur*, Fr. from *persecute*.) One who harasses others with continued malignity (*Milton*).

PERSEES, the descendants of a colony of ancient Persians, who took refuge at Bombay, Surat, and in the vicinity of those cities, when their own country was conquered 1100 years ago by the Mahometan Arabs. They are a gentle, quiet, and industrious people, loved by the Hindus, and living in great harmony among themselves. The consequence is, that they multiply exceedingly, whilst their countrymen in the province of Keman are visibly diminishing under the yoke of the Mahometan Persians. Of the manners and customs of this amiable race an interesting account is given in Niebuhr's Travels.

PERSEPHONE, a daughter of Jupiter and Ceres, called also Proserpine. (Vid. PROSERPINA.)—2. The mother of Amphion by Jasus.

PERSEPOLIS, a celebrated city, the capital of the Persian empire. It was laid in ruins by Alexander after the conquest of Darius. The reason of this is unknown. Some suppose that Alexander set it on fire at the instigation of Thais, one of his courtezans, when he had passed the day in riot and debauchery. The ruins of Persepolis still astonish the modern traveller by their grandeur and magnificence.

PERSEVE'RANCE. *s.* (*persévérance*, Fr. *perseverantia*, Lat.) 1. Persistence in any design or attempt; steadiness in pursuits; constancy in progress (*King Charles*). 2. Continuance in a state of grace (*Hammond*).

PERSEVE'RANT. *a.* (*perseverant*, Fr. *perseverans*, Lat.) Persisting: constant.

To PERSEVE'RE. *v. n.* (*persevero*, Lat. *perseverer*, French.) To persist in an attempt; not to give over; not to quit the design (*Wake*).

PERSEVE'RINGLY. *ad.* (from *persevere*.) With perseverance.

PERSEUS, in fabulous history, a son of Jupiter and Danae, the daughter of Acrisius. As Acrisius had confined his daughter in a brazen tower, to prevent her becoming a mother, because he was to perish, according to the words of an oracle, by the hands of his daughter's son; Perseus was no sooner born (vid. DANAE) than he was thrown into the sea with his mother Danae. The hopes of Acrisius were frustrated; the boat which carried Danae and her son was driven upon the island of Seriphos, one of the Cyclades, where they were found by a fisherman, and carried to Polydectes, the king of the place. They were treated with great humanity, and Perseus was entrusted to the care of the priests of Minerva's temple. His rising genius soon displeased Polydectes, who wished to offer violence to Danae, yet feared the resentment of her son. Polydectes, however, resolved to remove every obstacle. He invited his friends to an entertainment, who were to present the monarch with a beautiful horse. Perseus was also invited, as Polydectes knew that he could not receive from him the expected present. Perseus told the king, that as he could not give him a horse, he would bring him the head of the mortal gorgon Medusa. The offer was doubly agreeable to Polydectes, as the attempt might end in the ruin of Perseus. But the innocence of Perseus was patronized by the gods. Pluto lent him his helmet, Minerva her buckler, and Mercury his wings and talaria, with a short dagger called herpe. With these arms Perseus traversed the air, conducted by Minerva, and having discovered from the Graiæ, the sisters of the Gorgons, the place of their residence, he instantly flew to it. According to Hesiod and Apollodorus, it was beyond the western ocean Having found them asleep, he approached them, and cut off Medusa's

head with one blow. The noise awoke the two sisters, but Pluto's helmet rendered Perseus invisible. The conqueror made his way through the air, and from the blood of Medusa's head sprang those innumerable serpents in the deserts of Libya. Chrysaor also, with his golden sword, sprang from the drops of blood, as well as the horse Pegasus. Mean time Perseus had crossed the deserts of Libya, but the approach of night obliged him to alight in the territories of Atlas, king of Mauritania, where the monarch not only refused Perseus the hospitality he demanded, but he even offered violence to his person. Perseus finding himself inferior to Atlas, showed him Medusa's head, and instantly he was changed into a large mountain which bore the same name, in Africa. Perseus continued his flight, and as he passed over Libya, he discovered on the coasts of Æthiopia the naked Andromeda, exposed to a sea monster. He was struck at the sight, and offered her father Cepheus to deliver her if he obtained her in marriage. Cepheus consented, and immediately Perseus flew towards the monster, then advancing to devour Andromeda, and he plunged his dagger in his right shoulder, and destroyed it. This happy event was attended with the greatest rejoicings, and the nuptials were celebrated with the greatest festivity. The universal joy, however, was soon disturbed. Phineus, Andromeda's uncle, attempted to carry away the bride; a bloody battle ensued, and Perseus again shewed the Gorgon's head to his adversaries, and they were instantly turned to stone, each in the posture and attitude in which he then stood. Perseus, after this adventure, retired to Seriphos, at the moment that his mother Danae fled to the altar of Minerva to avoid Polydectes, who attempted to offer her violence. Polydectes met the same fate as Atlas and Phineus, he was also turned into a stone by the power of Medusa's head. And Dictys, who had formerly saved the life of Perseus and Danae, was placed by Persens on the throne of Seriphos. He then restored the armour he had received from the gods, having placed the Gorgon's head on the Ægis of Minerva. After these exploits, Perseus embarked for the Peloponnesus with his mother and Andromeda. When he reached the coast he was informed that Teutamias, king of Larissa, was then celebrating funeral games in honour of his father. This intelligence drew him to Larissa, to signalize himself in throwing the quoit, of which, according to some, he was the inventor. But here he was attended by an evil fate, and had the misfortune to kill a man with a quoit which he had thrown in the air. This was his grandfather Acrisius, and the oracle was fulfilled. This unfortunate murder greatly depressed the spirits of Perseus: by the death of Acrisius he was entitled to the throne of Argos, but he refused to reign there, and exchanged his kingdom for that of Tirynthus, and the maritime coast of Argolis, where Megapenthes the son of Prœtus then reigned. Being settled in this part of the Peloponnesus, he determined to found a new city, which he made the capital of his dominions, and which he called Mycenæ, because the pommel of his sword, called by the Greeks myces, had fallen there. The time of his death is unknown, yet it is universally agreed that he received divine honours like the rest of the ancient heroes. Perseus had by Andromeda, Alceus, Sthenelus, Nestor, Electryon, and Gorgophone, and after death, according to some mythologists, he became a constellation in the heavens.

Perseus, in astronomy, a constellation of the northern hemisphere, which, according to the catalogues of Ptolemy and Tycho, contains twenty-nine stars; but in the Britannic catalogue, sixty-seven.

Perseus, or Perses, a son of Philip king of Macedonia, who distinguished himself, like his father, by his enmity to the Romans, and declared war against them. He wanted courage and resolution, and his avarice and his timidity proved destructive to his cause. When Paulus Æmylius was appointed to the command of the Roman armies in Macedonia, Perseus shewed his inferiority by his imprudent incampments, and at the famous battle at Pydna, B. C. 168, he was the first who fled as soon as the battle was begun, leaving the enemy masters of the field. From Pydna, Perseus fled to Samothrace; but he was soon discovered and brought to the Roman conqueror, where the meanness of his behaviour exposed him to ridicule. He was carried to Rome, and dragged along the streets of the city to adorn the triumph of the conqueror. His family were also exposed to the sight of the Roman populace, who shed tears on viewing, dragged like a slave, a monarch who had once spread alarm all over Italy, by the greatness of his military preparations. Perseus died in prison, or according to some he was put to a shameful death the first year of his captivity.

PERSHORE, a town in Worcestershire, with a market on Tuesday, and a manufacture of stockings. Here are two churches, and that of Holy Cross contains several ancient monuments. It is seated on the Avon, nine miles E.S.E. of Worcester, and 106 W.N.W. of London.

PERSIA, a celebrated kingdom of Asia, which in its ancient state extended from the Hellespont to the Indus, above 2800 miles, and from Pontus to the shores of Arabia above 2000 miles. As a province, according to Ptolemy, it was bounded on the north by Media, west by Susiana, south by the Persian gulf, and east by Carmania. The empire of Persia was first founded by Cyrus the Great, about 559 years before the Christian era, and under the succeeding monarchs it became one of the most powerful kingdoms of the earth. The destruction of the Persian monarchy by the Macedonians was easily effected, and from that time Persia became tributary to the Greeks. After the death of Alexander, Seleucus Nicanor made himself master of the Persian provinces, till the revolt of the Parthians introduced new

revolutions. Persia was partly reconquered from the Greeks, and remained tributary to the Parthians for near 500 years. Artaxerxes, a common soldier, A. D. 220, became the founder of the second Persian monarchy, which proved so inimical to the Roman emperors. In their national character, the Persians were warlike; they were early taught to ride, and to handle the bow, and by the manly exercises of hunting, they were inured to bear the toils and fatigues of a military life. Their national valour, however, soon degenerated, and their want of employment at home soon rendered them unfit for war. The celebrated action at Thermopylæ, and Marathon, and the succeeding actions at Salamis, Platæa and Mysale, shew in a strong light the superiority of the Grecian soldiers over the Persians. The Persians were anciently called Cephenes, Achæmenians, and Artæi. They received the name of Persians from Perses the son of Perseus and Andromeda, who is supposed to have settled among them. Persepolis was the capital of the country.

Persia (Modern), is bounded on the N. by Georgia, the Caspian sea, and Usbec Tartary, W. by Turkey and Arabia, S. by the gulfs of Persia and Ormus and the Arabian sea, and E. by Hindustan. It is 1220 miles from E. to W. and 900 from N. to S. In the N. and E. parts it is mountainous and cold; in the middle and S E. parts, sandy and desert; in the S. and W. level and extremely fertile, though for several months very hot. The chief rivers are the Tigris and Kur; but there are many others, and several in the interior which are lost in sandy deserts. The soil produces all sorts of pulse and corn, except oats and rye. In several places, naptha, a sort of bitumen, rises out of the ground; and there are mines of gold, silver, iron, turcois stones, and salt; but the first two of these are not worked, on account of the scarcity of wood. Among the products of Persia that are peculiarly excellent, are dates, pistachio-nuts, and poppies, that produce the finest opium. There are extensive plantations of mulberry-trees for silkworms; and large flocks of sheep and goats. The camels, horses, mules, asses, oxen, and buffaloes, are the best of their kind, and are indifferently used for carrying passengers or burdens, the horses excepted, which are only used for the saddle. The principal manufactures are silks, as satins, tabbies, taffetas, and silk mixed with cotton, or with camels or goats hair; brocades, gold tissues, and gold velvet, carpets, calicoes, camlets, &c. During almost the whole of this century, Persia has been desolated by competitors for the sovereignty. On the assassination of the usurper, Nadir Shah, in 1747, Ahmed Abdalla, one of his generals, founded the kingdom of Candahar, to which he annexed the provinces of Korasan and Segestan, in the E. part of Persia, and those provinces of Hindustan Proper, W. of the Indus, that had been ceded by the great mogul, in 1737, to Nadir Shah. Kerim Khan, another of Nadir's officers, obtained the sovereignty of all the southern provinces. He transferred the seat of government from Ispahan to Schiras. He refused the title of Shah, or king, being satisfied with that of Protector of Persia. He was beloved by his subjects, and revered by foreign powers. On his death, in 1779, new competitors for the throne sprung up, and have almost ever since continued to spread slaughter and desolation over this unhappy country. The Persians are generally Mahometans, of the sect of Ali. Schiras is the capital.

Persia (Gulf of), a gulf between Persia and Arabia Felix. The entrance near Ormus is not above 30 miles over; but within it is 180 in breadth, and the length from Ormus to the mouth of the Euphrates is 420 miles.

PERSIAN LILY. See Frittilaria.

Persian wheel, an engine, or wheel, turned by a rivulet, or other stream of water, and fitted with open boxes at its cogs, to raise water for the overflowing of lands, or other purposes. It may be made of any size, according to the height the water is to be raised to, and the strength of the stream by which it is turned. This wheel is placed so, that its bottom only is immersed in the stream, wherein the open boxes at its cogs are all filled one after another with water, which is raised with them to the upper part of the wheel's circuit, and then naturally empties itself into a trough which carries it to the land.

Persian or Persic, in architecture, a name common to all statues of men, serving instead of columns to support entablatures.

PERSICA. (περσικα, from Persia, its native soil). The peach. The fruit of the amygdalus persica of Linnéus. It is known to be grateful and wholesome, seldom disagreeing with the stomach, unless this organ is not in a healthy state, or the fruit has been eaten to excess, when effects similar to those of the other dulco-acid summer fruits may be produced. The flowers, including the calyx, as well as the corol, are the parts of the persica used for medicinal purposes. These have an agreeable but weak smell, and a bitterish taste. Boulduc observes "that when distilled, without addition, by the heat of a water bath, they yield one-sixth their weight, or more, of a whitish liquid, which communicates to a considerable quantity of other liquids a flavour like that of the kernels of fruits." These flowers have a cathartic effect, and, especially to children, have been successfully given, in the character of a vermifuge; for this purpose, an infusion of a dram of the flowers dried, or half an ounce in their recent state, is the requisite dose. The leaves of the persica are also found to possess an anthelmintic power, and from a great number of experiments appear to have been given with invariable success both to children and adults. However, as the leaves and flowers of the persica manifest in some degree the quality of those of the laurocerasus, they ought to be used with caution. See Amygdalus.

PERSICARIA, in botany. See Polyganum.

PERSIMON PLUM. See Diospyros.

To PERSI'ST. *v. n.* (*persisto*, Lat. *persister*, Fr.) To persevere; to continue firm; not to give over (*South*).

PERSI'STANCE. PERSI'STENCY. *s.* (from *persist. Persistence* seems more proper.) 1. The state of persisting; steadiness; constancy; perseverance in good or bad (*Government of the Tongue*). 2. Obstinacy; obduracy; contumacy (*Shakspeare*).

PERSI'STIVE. *a.* (from *persist.*) Steady; not receding from a purpose; persevering (*Shakspeare*).

PERSIUS FLACCUS (Aulus), a Latin poet of Volaterræ. The early part of his life was spent in his native town, and at the age of sixteen he was removed to Rome, where he studied philosophy under Cornutus the celebrated Stoic. He also received the instructions of Palemon the grammarian, and Virginius the rhetorician. He distinguished himself by his satyrical humour, and made the faults of the orators and poets of his age the subject of his poems. He did not even spare Nero, and the more effectually to expose the emperor to ridicule, he introduced into his satires some of his verses. Persius died in the 30th year of his age, A. D. 62. The satires of Persius are six in number, blamed by some for obscurity of style and of language. But though unintelligible to some, they were read with pleasure by his contemporaries, and the difficulties which now appear in them arise from their not knowing the various characters, the vices, and the errors which they censured.

PE'RSON. *s.* (*personne*, Fr. *persona*, Lat.) 1. Individual or particular man or woman. 2. Man or woman considered as opposed to things, or distinct from them (*Sprat*). 3. Individual; man or woman (*Pearson*). 4. Human being, considered with respect to mere corporal existence (*Dryden*). 5. Man or woman considered as present, acting or suffering (*Shakspeare*). 6. A general loose term for a human being; one; a man (*Clarissa*). 7. One's self; not a representative (*Dryden*). 8. Exterior appearance (*Shakspeare*). 9. Man or woman represented in a fictitious dialogue (*Baker*). 10. Character (*Hayward*). 11. Character of office (*South*). 12. (In grammar.) The quality of the noun that modifies the verb (*South*).

PERSON is defined by some metaphysicians, a distinct substance of a rational intelligent nature.

The word person, *persona*, is thought to be borrowed *a personando*, from personating or counterfeiting; and is supposed to have first signified a mask: because, as Boethius informs us, *in larva concava sonus volvatur:* and hence the actors who appeared masked on the stage were sometimes called *larvati* and sometimes *personati*. He likewise says, that as the several actors represented each a single individual per- ol - viz. Œdipus, or Chremes, or Hecuba, or Mgcea; for this reason, other people, who chan at the same time distinguished by some- and the their *form*, character, &c. whereby gapenthesht be known, came likewise to be Being settlve Latins *personæ*, and by the Greeks πρόσωπα. Again, as actors rarely represented any but great and illustrious characters, the word came at length to import the mind, as being that whose dispositions constitute the character. And thus men, angels, and even God himself, were called persons. Things merely corporeal, as a stone, a plant, or a horse, were called *hypostases* or *supposita*, but never persons. Hence the learned suppose, that the same name person came to be used to signify some dignity, whereby a person is distinguished from another: as a father, husband, judge, magistrate, &c. In this sense we are to understand that of Cicero: "Cæsar never speaks of Pompey but in terms of honour and respect: he does many hard and injurious things, however, against his person."

Person we have already defined to mean an individual substance of a reasonable nature. Now, a thing may be individual two ways: 1. Logically, because it cannot be predicated of any other; as Cicero, Plato, &c. 2. Physically; in which sense a drop of water, separated from the ocean, may be called an individual. Person is an individual nature in each of these senses: logically, according to Boethius, because person is not spoken of universals, but only of singulars and individuals; we do not say the person of an animal or a man, but of Cicero and Plato: and physically, since Socrates's hand or foot are never considered as persons. This last kind of individual is denominated two ways: positively, when the person is said to be the whole principle of acting; for, to whatever thing action is attributed, that the philosophers call a person: and negatively, as when we say, with the Thomists, &c. that a person consists in this, that it does not exist in another as a more perfect being. Thus a man, though he consists of two different things, viz. body and spirit, is not two persons; because neither part of itself is a complete principle of action, but one person, since the manner of his consisting of body and spirit is such as constitutes one whole principle of action; nor does he exist in any other as a more perfect being.

PE'RSONABLE. *a.* (from *person.*) 1. Handsome; graceful; of good appearance (*Raleigh*). 2. (In law.) One that may maintain any plea in a judicial court (*Ainsworth*).

PE'RSONAGE. *s.* (*personage*, French.) 1. A considerable person; a man or woman of eminence (*Sidney*). 2. Exterior appearance; air; stature (*Hayward*). 3. Character assumed (*Addison*). 4. Character represented (*Broome*).

PE'RSONAL. *a.* (*personel*, Fr. *personalis*, Latin.) 1. Belonging to men or women, not to things; not real (*Hooker*). 2. Affecting individuals or particular people; peculiar; proper to him or her; relating to one's private actions or character (*Rogers*). 3. Present; not acting by representative (*Shakspeare*). 4. Exterior; corporal (*Addison*). 5. (In law.) Something moveable; something appendant to the person, as money; not real, as land (*Davies*). 6. (In grammar.) A personal verb is that which has all the regular modifications

of the three persons; opposed to the impersonal, that has only the third.

PERSONA'LITY. *s.* (from *personal.*) The existence or individuality of any one (*Locke*).

PE'RSONALLY. *ad.* (from *personal.*) 1. In person; in presence; not by representative (*Hooker*). 2. With respect to an individual; particularly (*Bacon*). 3. With regard to numerical existence (*Rogers*).

PERSONATA. (from *persona*, a disguised person, because, according to Pliny, the ancient actors used to mask themselves with the leaves of this plant.) In botany, the great burdock. See BARDANA.

PERSONATE COROL. (*persona*, a mask.) In botany, a masked corol. Ringens, sed inter labia palato clausa. Ringent, but closed between the lips by the palate.—But surely ringent or gaping with the lips closed, is a contradiction in terms. It would better to define it, a species of labiate corol with the lips closed. See LABIATE.

Tournefort, from whom Linnéus adopted these terms, is clear and precise in his distinction. A labiate flower, according to him, is drawn out at bottom into a tube, and is widened at top either into one or two lips. The pistil becomes a fruit of four seeds ripening in the calyx as in a capsule: as in salvia, horminum, marrubium, chamædrys.—A personate flower differs from this in having the pistil becoming a capsule entirely distinct from the calyx. It has something of the same appearance as the labiate flower; but does not ill represent a mask, or the snout of some animals. This he exemplifies in linaria, antirrhinum, pedicularis, melampyrum.—There are some irregular monopetalous flowers which Linnéus includes under his ringents, that are neither the labiate nor personate of Tournefort: as digitalis and scrophularia.

To PE'RSONATE. *v. a.* (from *persona*, Lat.) 1. To represent by a fictitious or assumed character, so as to pass for the person represented (*Bacon*). 2. To represent by action or appearance; to act (*Crashaw*). 3. To pretend hypocritically (*Swift*). 4. To counterfeit; to feign (*Hammond*). 5. To resemble (*Shakspeare*). 6. To make a representative of, as in picture: out of use (*Shakspeare*). 7. To describe: out of use (*Shakspeare*).

PERSONA'TION. *s.* (from *personate.*) Counterfeiting of another person (*Bacon*).

PERSONIFICA'TION. *s.* (from *personify.*) Prosopopœia; the change of things to persons: as, *Confusion* heard his voice.

To PERSO'NIFY. *v. a.* (from *person.*) To change from a thing to a person.

PERSOONIA, in botany, a genus of the class tetrandria, order monogynia. Calyxless; petals four, bearing the stamens towards the base; glands four at the base of the germ; stigma obtuse; drupe one-seeded. Two species; Australasian plants, with linear or lanceolate leaves; and solitary, axillary flowers of a yellow hue.

PERSPECTIVE, the art of delineating visible objects on a plain surface, such as they appear at a given distance, or height, upon a transparent plane, placed commonly perpendicular to the horizon, between the eye and the object. This is particularly called

Linear perspective, as regarding the position, magnitude, form, &c. of the several lines, or contours of objects, and expressing their diminution.

Some make this a branch of optics; others an art and science derived from it: its operations however are all geometrical.

HISTORY OF PERSPECTIVE.—This art derives its origin from painting, and particularly from that branch of it which was employed in the decorations of the theatre, where landscapes were chiefly introduced. Vitruvius, in the proem to his 7th book, says that Agatharchus, at Athens, was the first author who wrote upon this subject, on occasion of a play exhibited by Æschylus, for which he prepared a tragic scene; and that afterwards the principles of the art were more distinctly taught in the writings of Democritus and Anaxagoras, the disciples of Agatharchus, which are not now extant.

The perspective of Euclid and of Heliodorus Larisseus contains only some general elements of optics, that are by no means adapted to any particular practice; though they furnish some materials that might be of service even in the linear perspective of painters.

Geminus, of Rhodes, a celebrated mathematician, in Cicero's time, also wrote upon this science.

It is also evident that the Roman artists were acquainted with the rules of perspective, from the account which Pliny (Nat. Hist. lib. 35, cap. 4,) gives of the representation on the scene of those plays given by Claudius Pulcher; by the appearance of which the crows were so deceived, that they endeavoured to settle on the fictitious roofs. However, of the theory of this art among the ancients we know nothing; as none of their writings have escaped the general wreck of ancient literature in the dark ages of Europe. Doubtless this art must have been lost, when painting and sculpture no longer existed. However, there is reason to believe that it was practised much later in the Eastern empire.

John Tzetzes, in the 12th century, speaks of it as well acquainted with its importance in painting and statuary. And the Greek painters, who were employed by the Venetians and Florentines, in the 13th century, it seems brought some optical knowledge along with them into Italy: for the disciples of Giotto are commended for observing perspective more regularly than any of their predecessors in the art had done; and he lived in the beginning of the 14th century.

The Arabians were not ignorant of this art; as may be presumed from the optical writings of Alhazen, about the year 1100. And Vitellus, a Pole, about the year 1270, wrote largely and learnedly on optics. And, of our own nation, friar Bacon, as well as John Peckham, archbishop of Canterbury, treated this subject with surprising accuracy, considering the times in which they lived.

The first authors who professedly laid down rules of perspective were Bartolomeo Bramantino, of Milan, whose book, Regole di Perspectiva, e Misure delle Antichita di Lombardia, is dated 1440; and Pietro del Borgo, likewise an Italian, who was the most ancient author met with by Ignatius Danti, and who it is supposed died in 1443. This last writer supposed objects placed beyond a transparent tablet, and so to trace the images, which rays of light, emitted from them, would make upon it.

And Albert Durer constructed a machine upon the principles of Borgo, by which he could trace the perspective appearance of objects.

Leon Battista Alberti, in 1450, wrote his treatise De Pictura, in which he treats chiefly of perspective.

Balthazar Peruzzi, of Siena, who died in 1536, had diligently studied the writings of Borgo; and his method of perspective was published by Serlio in 1540. To him it is said we owe the discovery of points of distance, to which are drawn all lines that make an angle of 45° with the ground line.

Guido Ubaldi, another Italian, soon after discovered, that all lines that are parallel to one another, if they be inclined to the ground line, converge to some point in the horizontal line; and that through this point also will pass a line drawn from the eye parallel to them. His perspective was printed at Pisaro in 1600, and contained the first principles of the method afterwards discovered by Dr. Brook Taylor.

In 1583 was published the work of Giacomo Barozzi, of Vignola, commonly called Vignola, intitled the two rules of perspective, with a learned commentary by Ignatius Danti. In 1615 Marolois' work was printed at the Hague, and engraved and published by Hondius. And in 1625, Sirigatti published his treatise of perspective, which is little more than an abstract of Vignola's.

Since that time the art of perspective has been gradually improved by subsequent geometricians, particularly by professor Gravesande, and still more by Dr Brook Taylor, whose principles are in a great measure new, and far more general than those of any of his predecessors. He did not confine his rules, as they had done, to the horizontal plane only, but made them general, so as to affect every species of lines and planes, whether they were parallel to the horizon or not; and thus his principles were made universal. Besides, from the simplicity of his rules, the tedious progress of drawing out plans and elevations for any object, is rendered useless, and therefore avoided; for by this method, not only the fewest lines imaginable are required to produce any perspective representation, but every figure thus drawn will bear the nicest mathematical examination. Farther, his system is the only one calculated for answering every purpose of those who are practitioners in the art of design; for by it they may produce either the whole, or only so much of an object as is wanted; and by fixing it in its proper place, its apparent magnitude may be determined in an instant. It explains also the perspective of shadows, the reflection of objects from polished planes, and the inverse practice of perspective.

His Linear Perspective was first published in 1715; and his New Principles of Linear Perspective in 1719, which he intended as an explanation of his first treatise. And his method has been chiefly followed by all others since.

In 1738, Mr. Hamilton published his Stereography, in 2 vols. folio, after the manner of Dr. Taylor. But the neatest system of perspective, both as to theory and practice, on the same principles, is that of Mr. Kirby. There are also good treatises on the subject, by Desargues, de Bosse, Albertus, Lamy, Niceron, Pozzo the Jesuit, Ware, Cowley, Priestly, Ferguson, Emerson, Malton, Henry Clarke, &c. &c. A new edition of Brook Taylor's Perspective has been recently published, as well as a very ingenious treatise founded on the same principles, by Mr. Creswell, of Trinity College, Cambridge.

Principles of perspective.—In order to understand the principles of perspective, it will be proper to consider the plane on which the representation is to be made as transparent, and interposed between the eye of the spectator and the object to be represented. Thus, suppose a person at a window looks through an upright pane of glass at any object beyond it, and, keeping his head steady, draws the figure of the object upon the glass with a black-lead pencil, as if the point of the pencil touched the object itself; he would then have a true representation of the object in perspective as it appears to his eye.

To this purpose two things are necessary: first, that the glass be laid over with strong gum-water, which, when dry, will be fit for drawing upon, and will retain the traces of the pencil; and, secondly, that he looks through a small hole in a thin plate of metal, fixed about a foot from the glass, between it and his eye, and that he keeps his eye close to the hole; otherwise he might shift the position of his head, and consequently make a false delineation of the object.

Having traced out the figure of the object, he may go over it again with pen and ink; and, when that is dry, put a sheet of paper upon it, and trace it thereon with a pencil: then taking away the paper, and laying it on a table, he may finish the picture by giving it the colours, lights, and shades, as he sees them in the object itself; and then he will have a true resemblance of the object.

To every person who has a general knowledge of the principles of optics, this must be self-evident: for, as vision is occasioned by pencils of rays coming in straight lines to the eye from every point of the visible object, it is plain that, by joining the points in the transparent plane through which all those pencils respectively pass, an exact representation must be formed of the object, as it appears to the eye in that particular position, and at that determined distance; and were pictures of things to be always first drawn on transparent planes, this simple operation, with the principle on which it is founded, would comprise the whole theory and practice of perspective. As this, however, is far from being the case, rules must be deduced from the sciences of optics and geometry for drawing representations of visible objects on opaque planes; and the application of these rules constitutes what is properly called the art of perspective.

Previous to our laying down the fundamental principles of this art, it may not be improper to observe, that when a person stands right against the middle of one end of a long avenue or walk, which is straight and equally broad throughout, the sides thereof seem to approach nearer and nearer to each other as they are further and further from his eye; or the angles, under which their different parts are seen, become less and less according as the distance from his eye increases; and if the avenue be very long, the sides of it at the farthest end will seem to meet: and there an object that would cover the whole breadth of the avenue, and be of a height equal to that breadth, would appear only to be a mere point.

Having made these preliminary observations, we now proceed to the practice of perspective, which is built upon the following

Fundamental THEOREM I.

Let *a b c d* (fig. 1. plate 134.) represent the ground-plan of the figure to be thrown into perspective, and *e f g h* the transparent plane through

which it is viewed by the eye at E. Let these planes intersect in the straight line $k\,l$. Let B be any point in the ground-plan, and BE a straight line, the path of a ray of light from that point to the eye. This will pass through the plane $e\,f\,g\,h$ in some point b; or B will be seen through that point, and b will be the picture, image, or representation of B.

If BA be drawn in the ground-plan, making any angle BAK with the common intersection, and E V be drawn parallel to it, meeting the picture-plane or perspective-plane in V, and VA be drawn, the point b is in the line VA so situated that BA is to EV as bA to bV.

For since EV and BA are parallel, the figure BAbVEbB is on one plane, cutting the perspective-plane in the straight line VA; the triangles BAb, EVb, are similar, and BA : EV=bA : bV.

Cor. 1.—If B be beyond the picture, its picture b is above the intersection $k\,b$; but if B be between the eye and the picture, as at B′, its picture b' is below $k\,b$.

2. If two other parallel lines BA′, ES, be drawn, and A′, S, be joined, the picture of B is in the intersection of the lines AV and A′S.

3. The line BA is represented by bA, or bA is the picture of BA; and if AB be infinitely extended, it will be represented by AV. V is therefore called the vanishing point of the line AB.

4. All lines parallel to AB are represented by lines converging to V from the points where these lines intersect the perspective-plane; and therefore V is the vanishing point of all such parallel lines.

5. The pictures of all lines parallel to the perspective-plane are parallel to the lines themselves.

6. If through V be drawn HVD parallel to $k\,l$, the angle EVH is equal to BAK.

Remark.—The proposition now demonstrated is not limited to any inclination of the picture-plane to the ground-plane: but it is usual to consider them as perpendicular to each other, and the ground plan as horizontal. Hence the line $k\,l$ is called the ground-line, and OH the horizon-line; and VK perpendicular to both, is called the height of the eye.

If ES be drawn perpendicular to the picture-plane, it will cut it in a point S of the horizon-line directly opposite to the eye. This is called the point of sight, or principal point.

7. The pictures of all vertical lines are vertical, and the pictures of horizontal lines are horizontal, because these lines are parallel to the perspective-plane.

8. The point of sight S is the vanishing point of all lines perpendicular to the perspective-plane.

The above proposition is a sufficient foundation for the whole practice of perspective, whether of direct or inclined pictures, and serves to suggest all the various practical constructions, each of which has advantages which suit particular purposes. Writers on the subject have either confined themselves to one construction, from an affectation of simplicity or fondness for system; or have multiplied precepts, by giving every construction for every example, in order to make a great book, and give the subject an appearance of importance and difficulty. An ingenious practitioner will avoid both extremes, and avail himself of the advantage of each construction as it happens to suit his purpose. We shall now proceed to the practical rules, which require no consideration of intersecting planes, and are all performed on the perspective plane by means of certain substitutions for the place of the eye and the original figure The general substitution is as follows:

Let the plane of the paper be first supposed to be the ground-plan, and the spectator to stand at F (fig. 2.) Let it be proposed that the ground-plan is to be represented on a plane surface, standing perpendicularly on the line GKI of the plan, and that the point K is immediately opposite to the spectator, or that FK is perpendicular to GL: then FK is equal to the distance of the spectator's eye from the picture.

Now suppose a piece of paper laid on the plan with its straight edge lying on the line GL; draw on this paper KS perpendicular to GL, and make it equal to the height of the eye above the ground-plan. This may be much greater than the height of a man, because the spectator may be standing on a place much raised above the ground-plan. Observe also that KS must be measured on the same scale on which the ground-plan and the distance FK were measured. Then draw HSO parallel to GL. This will be a horizontal line, and (when the picture is set upright on GL) will be on a level with the spectator's eye, and the point S will be directly opposite to his eye. It is therefore called the principal point, or point of sight. The distance of his eye from this point will be equal to FK. Therefore make SP (in the line SK) equal to FK, and P is the projecting point or substitute for the place of the eye. It is sometimes convenient to place P above S, sometimes to one side of it on the horizontal line, and in various other situations; and writers, ignorant of or inattentive to the principles of the theory, have given it different denominations, such as point of distance, point of view, &c. It is merely a substitute for the point E in fig 1. and its most natural situation is below, as in this figure.

The art of perspective is conveniently divided into Ichnography, which teaches how to make a perspective draught of figures on a plane, commonly called the ground-plan; and Scenography, which teaches how to draw solid figures, or such figures as are raised above this plan.

Fundamental PROB. 1.—To put into perspective any given point of the ground-plan.

First general construction.

From B and P (fig. 2.) draw any two parallel lines BA, PV, cutting the ground-line and horizon-line in A and V, and draw BP, AV, cutting each other in b; b is the picture of B.

For it is evident that BA, PV, of this figure are analogous to BA and EV of fig. 1. and that BA : PV= : bV.

If BA′ be drawn perpendicular to GL, PV will fall on PS, and need not be drawn. A′V will be A′S.—This is the most easy construction, and is nearly the same with Ferguson's.

Second general construction.

Draw two lines BA, BA″, and two lines PV, PD parallel to them, and draw AV, A″D, cutting each other in b; b is the picture of B by Cor. 2.—This construction is the foundation of all the rules of perspective that are to be found in the books on this subject. They appear in a variety of forms, owing to the ignorance or inattention of the authors to the principles. The rule most generally adhered to is as follows:

Draw BA (fig. 3.) perpendicular to the ground-line, and AS to the point of sight, and set off Aβ equal to BA. Set off SD equal to the distance of the eye in the opposite direction from S that β is from A, where B and E of fig. 1. are on opposite sides of the picture; otherwise set them the same way. D is called the point of distance. Draw βD

cutting AS in B. This is evidently equivalent to drawing BA and PS perpendicular to the ground-line and horizon-line, and $B\beta$ and PD, making an angle of 45° with these lines, with the additional puzzle about the way of setting off $A\beta$ and SD, which is avoided in the construction here given.

This usual construction, however, by a perpendicular and the point of distance, is extremely simple and convenient; and two points of distance, one on each side of S, serve for all points of the ground-plan. But the first general construction requires still fewer lines, if BA be drawn perpendicular to GL, because PV will then coincide with PS.

Third general construction.

Draw BA from the given point B perpendicular to the ground-line, and AS to the point of sight. From the point of distance D set off D d equal to BA, on the same or the contrary side as S, according as B is on the same or the contrary side of the picture as the eye. Join d, A, and draw Db parallel to dA. b is the picture of B. For SD, Dd, are equal to the distances of the eye and given point from the picture, and SD : Dd = bS : bA.

This construction does not naturally arise from the original lines, but it is a geometrical consequence from their position and magnitude; and it is of all others the most generally convenient, as the perpendicular distances of any number of points may be arranged along SD without confusion, and their direct situations transferred to the ground-line by perpendiculars such as BA; and nothing is easier than drawing parallels, either by a parallel-ruler or a bevel-square, used by all who practise drawing.

Prob. 2.—To put any straight line BC (fig. 4. plate 154.) of the ground-plan in perspective.

Find the pictures b, c, of its extreme points by any of the foregoing constructions, and join them by the straight line b c.

Perhaps the following construction will be found very generally convenient.

Produce CB till it meet the ground-line in A, and draw PV parallel to it, and AV, and PB, PC, cutting AV in b, c. V is its vanishing point, by Cor. 3. of the fundamental theorem.

It must be left to the experience and sagacity of the drawer to select such constructions as are most suitable to the multiplicity of the figures to be drawn.

Prob. 3.—To put any rectilineal figure of the ground-plan in perspective.

Put the bounding lines in perspective, and the problem is solved.

The variety of constructions of this problem is very great, and it would fill a volume to give them all. The most generally convenient is to find the vanishing points of the bounding lines, and connect these with the points of their intersection with the ground-line. For example, to put the square ABCD (fig. 5.) into perspective.

Draw from the projecting point PV, PW, parallel to AB, BC, and let AB, BC, CD, DA, meet the ground-line in α, $\varkappa$, β, δ, and draw αV, δV, $\varkappa$W, βW, cutting each other in a b c d, the picture of the square ABCD. The demonstration is evident.

This construction, however, runs the figure to great distances on each side of the middle line when any of the lines of the original figure are nearly parallel to the ground-line.

The following construction (fig. 6.) avoids this inconvenience.

Let B be the point of distance. Draw the perpendiculars Aα, Bβ, C$\varkappa$, Dδ, and the lines Ae, Bf, Cg, Dh, parallel to P D. Draw Sα, Sβ, S$\varkappa$, Sδ, and De, Df, Dg, Dh, cutting the former in a, b, c, d, the angles of the picture.

It is not necessary that D be the point of distance, only the lines Ae, Bf, &c. must be parallel to PD.

Remark.—In all the foregoing constructions the necessary lines (and even the finished picture) are frequently confounded with the original figure. To avoid this great inconvenience, the writers on perspective direct us to transpose the figure; that is, to transfer it to the other side of the ground-line, by producing the perpendiculars Aα, Bβ, C$\varkappa$, Dδ, till αA′, βB′, &c. are respectively equal to Aα, Bβ, &c.; or, instead of the original figure, to use only its transposed substitute A′B′C′D′. This is an extremely proper method. But in this case the point P must also be transposed to P′ above S, in order to retain the first or most natural and simple construction, as in fig. 7.; where it is evident that when BA = AB′, and SP = SP′, and B′P′ is drawn, cutting AS in b, we have bA : bS = B′A : P′S, = BA : PS, and b is the picture of B: whence follows the truth of all the subsequent constructions with the transposed figure.

Prob. 4.—To put any curvilineal figure on the ground-plan into perspective.

Put a sufficient number of its points in perspective by the foregoing rules, and draw a curve line through them.

It is well known that the conic sections and some other curves, when viewed obliquely, are conic sections or curves of the same kinds with the originals, with different positions and proportions of their principal lines, and rules may be given for describing their pictures founded on this property. But these rules are very various, unconnected with the general theory of perspective, and more tedious in the execution, without being more accurate than the general rule now given. It would be a useless affectation to insert them in this elementary treatise.

We come in the next place to the delineation of figures not in a horizontal plane, and of solid figures. For this purpose it is necessary to demonstrate the following

Theorem II.

The length of any vertical line standing on the ground-plane is to that of its picture, as the height of the eye to the distance of the horizon-line from the picture of its foot.

Let BC be the vertical line standing on B, and let EF be a vertical line through the eye. Make BD equal to EF, and draw DE, CE, BE. It is evident that DE will cut the horizon-line in some point d, CE will cut the picture-plane in c, and BE will cut it in b, and that b c will be the picture of BC, and is vertical, and that BC is to b c as BD to b d, or as EF to b d.

Cor. The picture of a vertical line is divided in the same ratio as the line itself. For BC : BM = b c : b m.

Prob. 5.—To put a vertical line of a given length in perspective standing on a given point of the picture.

Through the given point b (fig. 8. plate 184.) of the picture, draw S b A from the point of sight, and draw the vertical line AD, and make AE equal to the length or height of the given line. Join ES, and draw b c parallel to AD, producing b c, when necessary, till it cut the horizontal line in d, and we have b c : b d = AD : AE, that is, as the

length of the given line to the height of the eye, and $b\,d$ is the distance of the horizon-line from the point b, which is the picture of the root of the line. Therefore (Theor. 2.) $b\,c$ is the required picture of the vertical line.

This problem occurs frequently in views of architecture; and a compendious method of solving it would be peculiarly convenient. For this purpose, draw a vertical line XZ at the margin of the picture, or on a separate paper, and through any point V of the horizon-line draw VX. Set off XY, the height of the vertical line, and draw VY. Then from any points b, r, on which it is required to have the pictures of lines equal to XY, draw bS, $r\,t$, parallel to the horizon-line, and draw the verticals Su, $t\,v$: these have the lengths required, which may be transferred to b and r. This, with the third general construction for the base points, will save all the confusion of lines which would arise from constructing each line apart.

Prob. 6.—To put any sloping line in perspective.

From the extremities of this line, suppose perpendiculars meeting the ground-plane in two points, which we shall call the base points of the sloping line. Put these base points in perspective, and draw, by last problem, the perpendiculars from the extremities. Join these by a straight line. It will be the picture required.

Prob. 7.—To put a square in perspective, as seen by a person not standing right against the middle of either of its sides, but rather nearly even with one of its corners.

In fig. 1. plate 135. let ABCD be a true square, viewed by an observer, not standing at o, directly against the middle of its side AD, but at O almost even with its corner D, and viewing the side AD under the angle AOD; the angle AoD (under which he would have seen AD from o) being 60 degrees.

Make AD in fig. 2. equal to AD in fig. 1. and draw SP and OO parallel to AD. Then, in fig. 10. let O be the place of the observer's eye, and SO be perpendicular to SP; then S shall be the point of sight in the horizon SP.

Take SO in your compasses, and set that extent from S to P: then P shall be the true point of distance, taken according to the foregoing rules.

From A and D draw the straight lines AS and DS; draw also the straight line AP, intersecting DS in C.

Lastly, to the point of intersection C, draw BC parallel to AD; and ABCD in fig. 2. will be a true perspective representation of the square ABCD in fig. 1. The point M is the centre of each square, and AMC and BMD are the diagonals.

Prob. 8.—To put a reticulated square in perspective, as seen by a person standing opposite to the middle of one of its sides.

A reticulated square is one that is divided into several little squares, like net-work, as fig. 4. each side of which is divided into four equal parts, and the whole surface into four times four (or 16) equal squares.

Having divided this square into the given number of lesser squares, draw the two diagonals AxC and BxD.

Make AD in fig. 5. equal to AD in fig. 11. and divide it into four equal parts, as A e, e g, g i, and i D.

Draw SP for the horizon, parallel to AD, and, through the middle point g of AD, draw OS perpendicular to AD and SP. Make S the point of sight, and O the place of the observer's eye.

Take SP equal to SO, and P shall be the true point of distance. Draw AS and DS to the point of sight, and AP to the point of distance, intersecting DS in C: then draw BC parallel to AD, and the outlines of the reticulated square ABCD will be finished.

From the division points, e, g, i, draw the straight lines $e\,f$, $g\,h$, $i\,k$, tending towards the point of sight S; and draw BD for one of the diagonals of the square, the other diagonal AC being already drawn.

Through the points r and s, where these diagonals cut $e\,f$ and $i\,k$, draw $l\,m$ parallel to AD. Through the centre point x, where the diagonals cut $g\,h$, draw $n\,o$ parallel to AD. Lastly, through the points v and w, where the diagonals cut $e\,f$ and $i\,k$, draw $p\,q$ parallel to AD; and the reticulated perspective square will be finished.

This square is truly represented, as if seen by an observer standing at O, and having his eye above the horizontal plane ABCD on which it is drawn; as if OS was the height of his eye above that plane: and the lines which form the small squares within it have the same letters of reference with those in fig. 11. which is drawn as it would appear to an eye placed perpendicularly above its centre, x.

Prob. 9.—To put a circle in perspective.

If a circle be viewed by an eye placed directly over its centre, it appears perfectly round; but if it be obliquely viewed, it appears of an elliptical shape. This is plain by looking at a common wine glass set upright on a table.

Make a true reticulated square, as fig. 4. plate 135 of the same diameter as you would have the circle; and setting one foot of your compasses in the centre x, describe as large a circle as the sides of the square will contain. Then, having put this reticulated square into perspective, as in fig. 12. observe through what points of the cross lines and diagonals of fig. 11. the circle passes; and through the like points in fig. 12. draw the ellipsis, which will be as true a perspective representation of the circle, as the square in fig. 12. is of the square in fig. 11.

Prob. 10.—To put a cube in perspective, as if viewed by a person standing almost even with one of its edges, and seeing three of its sides.

In fig. 6. plate 135. let AB be the breadth of either of the six equal square sides of the cube AG. O the place of the observer, almost even with the edge CD of the cube, S the point of sight, SP the horizon parallel to AD, and P the point of distance taken as before.

Make ABCD a true square; draw BS and CS to the point of sight, and BP to the point of distance, intersecting CS in G. Then draw FG parallel to BC, and the uppermost perspective square side BFGC of the cube will be finished.

Draw DS to the point of sight, and AP to the point of distance, intersecting DS in the point I then draw GI parallel to CD; and, if the cube be an opaque one, as of wood or metal, all the outlines of it will be finished; and then it may be shaded as in the figure.

But if you want a perspective view of a transparent glass cube, all the sides of which will be seen, draw AH toward the point of sight, FH parallel to BA, and HI parallel to AD: then AHID will be the square base of the cube, perspectively parallel to the top BFGC; ABFH will be the square side of the cube, parallel to CGID, and FGIH will be the square side parallel to ABCD.

Prob. 11.—To put any solid in perspective.

Put the base of the solid, whatever it be, in perspective, by the preceding rules. From each

bounding point of the base, raise lines representing in perspective the altitude of the object; by joining these lines and shading the figure according to the directions in the preceding problem, you will have a scenographic representation of the object. This rule is general; but as its application to particular cases may not be apparent, it will be proper to give the following example of it.

PROB. 12.—To put a square pyramid in perspective, as standing upright on its base, and viewed obliquely.

In fig. 6. No. 1. of plate 135. let AD be the breadth of either of the four sides of the pyramid ATCD at its base ABCD; and MT its perpendicular height. Let O be the place of the observer, S his point of sight, SE his horizon, parallel to AD and perpendicular to OS; and let the proper point of distance be taken in SE produced toward the left hand, as far from S as O is from S.

Draw AS and DS to the point of sight, and DL to the point of distance, intersecting AS in the point B Then, from B, draw BC parallel to AD; and ABCD shall be the perspective square base of the pyramid.

Draw the diagonal AC, intersecting the other diagonal BD at M, and this point of intersection shall be the centre of the square base.

Draw MT perpendicular to AD, and of a length equal to the intended height of the pyramid: then draw the straight outlines AT, CT, and DT; and the outlines of the pyramid (as viewed from O) will be finished; which being done, the whole may be so shaded as to give it the appearance of a solid body.

If the observer has stood at *o*, he could have only seen the side ATD of the pyramid; and two is the greatest number of sides that he could see from any other place of the ground. But if he were at any height above the pyramid, and had his eye directly over its top, it would then appear as in N°. 2. and he would see all its four sides E, F, G, H, with its top *t* just over the centre of its square base ABCD; which would be a true geometrical and not a perspective square.

PROB. 13.—To put two equal squares in perspective, one of which shall be directly over the other, at any given distance from it, and both of them parallel to the plane of the horizon.

In fig. 7. plate 135. let ABCD be a perspective square on a horizontal plane, drawn according to the foregoing rules, S being the point of sight, SP the horizon (parallel to AD), and P the point of distance.

Suppose AD, the breadth of the square, to be three feet; and that it is required to place just such another square EFGH directly above it, parallel to it and two feet from it.

Make AE and DH perpendicular to AD, and two thirds of its length draw EH, which will be equal and parallel to AD; then draw ES and HS to the point of sight S, and EP to the point of distance P, intersecting HS in the point G: this done, draw FG parallel to EH; and you will have two perspective squares ABCD and EFGH, equal and parallel to one another, the latter directly above the former, and two feet distant from it; as was required.

By this method shelves may be drawn parallel to one another, at any distance from each other in proportion to their length.

PROB. 14.—To put a square table in perspective, standing on four upright square legs of any given length with respect to the breadth of the table.

In fig. 7. plate 135. let ABCD be the square part of the floor on which the table is to stand, and EFGH the surface of the square table, parallel to the floor.

Suppose the table to be three feet in breadth, and its height from the floor to be two feet; then two thirds of AD or EH will be the length of the legs *i* and *k*; the other two (*l* and *m*) being of the same length in perspective.

Having drawn the two equal and parallel squares ABCD and EFGH, as shown in prob. 13. let the legs be square in form, and fixed into the table at a distance from its edges equal to their thickness. Take A*a* and D*d* equal to the intended thickness of the legs, and *a b* and *d c* also equal thereto. Draw the diagonals AC and BD, and draw straight lines from the points *a*, *b*, *c*, *d*, towards the point of sight S, and terminating at the side BC. Then, through the points where these lines cut the diagonals, draw the straight lines *n* and *o*, *p* and *q*, parallel to AD: and you will have formed four perspective squares (like ABCD in fig. 6. N°. 1.) for the bases of the four legs of the table: and then it is easy to draw the four upright legs by parallel lines, all perpendicular to AD; and to shade them as in the figure.

To represent the intended thickness of the table board, draw *e h* parallel to EH, and HG toward the point of sight S: then shade the spaces between these lines, and the perspective figure of the table will be finished.

PROB. 15.—To put three rows of upright square objects in perspective, equal in size, and at equal distances from each other, on an oblong square plane, the breadth of which shall be of any assigned proportion to the length thereof.

Fig. 8. plate 135. is a perspective representation of an oblong square plane, three times as long as it is broad, having a row of nine upright square objects on each side, and one of the same number in the middle; all equally high, and at equal distances from one another, both long-wise and cross-wise, on the same plane.

In fig. 1. plate 136, PS is the horizon, S the point of sight, P the point of distance, and AD (parallel to PS) the breadth of the plane.

Draw AS, NS, and DS, to the point of sight S; the point N being in the middle of the line AD: and draw DP to the point of distance P, intersecting AS in the point B: then, from B draw BC parallel to AD, and you have the perspective square ABCD.

Through the point *i*, where DB intersects NS, draw *a e* parallel to AD; and you will have subdivided the perspective square ABCD into four lesser squares, as A *a i* N, N *i e* D, *a* B *k i*, and *i k* C *e*.

From the point C (at the top of the perspective square ABCD) draw CP to the point of distance P, intersecting AS in E; then, from the point E draw EF parallel to AD; and you will have the second perspective square BEFC.

Through the point *l*, where CE intersects NS, draw *b f* parallel to AD; and you will have subdivided the square BEFC into the four squares B *b l k*, *k l f* C, *b* E *m l*, and *l m* F *f*.

From the point F (at the top of the perspective square BEFG) draw FP to the point of distance P, intersecting AS in I; then from the point I draw IK parallel to AD, and you will have the third perspective square EIKF.

Through the point *n*, where FI intersects NS, draw *c g* parallel to AD; and you will have subdivided the square EIKF into four lesser squares, E *c n m*, *m n g* F, *c* I *o n*, and *n o* K *g*.

From the point K (at the top of the third per-

spective square EIKF) draw KP to the point of distance P, intersecting AS in L; then from the point L draw LM parallel to AD; and you will have the fourth perspective square ILMK.

Through the point *p*, where KL intersects NS, draw *d h* parallel to AD; and you will have subdivided the square ILMK into the four lesser squares I *d p o*, *o p b* K, *d* L *q p*, and *p q* M *h*.

Thus we have formed an oblong square ALMD, whose perspective length is equal to four times its breadth, and it contains 16 equal perspective squares. If greater length was still wanted, we might proceed further on toward S.

Take A 3, equal to the intended breadth of the side of the upright square object AQ (all the other sides being of the same breadth), and AO for the intended height. Draw O 18 parallel to AD, and make D 8 and 4 7 equal to A 3; then draw 3 S, 4 S, 7 S, and 8 S, to the point of sight S; and among them we shall have the perspective square bases of all the 27 upright objects on the plane.

Through the point 9, where DB intersects 3 S, draw 1 10 parallel to AD, and you have the three perspective square bases A 1 2 3, 4 5 6 7, 8 9 10 D, of the three upright square objects at A, N, and D.

Through the point 21, where *e b* intersects 8 S, draw 14, 11, parallel to AD; and you will have the three perspective squares *a* 14 15 16 17 18 19 20, and 21 11 *e* 22 for the bases of the second cross-row of objects; namely, the next beyond the first three at A, N, and D.

Through the point *m*, where CE intersects 8 S, draw a line parallel to BC; and you will have three perspective squares, at B, *k*, and C, for the bases of the third row of objects; one of which is set up at B.

Through the point *x*, where *f c* intersects 3 S, draw a line parallel to *b f*; and you will have three perspective squares, at *t*, *l*, and *x*, for the bases of the fourth cross-row of objects.

Go on in this manner, as you see in the figure, to find the rest of the square bases, up to LM; and you will have 27 upon the whole oblong square plane, on which you are to place the like number of objects, as in fig. 8. plate 135.

Having assumed AO for the perspective height of the three objects at A, N, and D (fig. 1. plate 138.) next the observer's eye, and draw O 18 parallel to AD, in order to make the objects at N and D of the same height as that at O; and having drawn the upright lines 4 15. 7 W, 8 X, and D 22, for the heights N and D; draw OS and RS, 15 S and WS, XS and 22 S, all to the point of sight S: and these lines will determine the perspectively equal heights of all the rest of the upright objects, as shown by the two placed at *a* and B.

To draw the square tops of these objects, equal and parallel to their bases, we need only give one example, which will serve for all.

Draw 3 R and 2 Q parallel to AO, and up to the line RS; then draw PQ parallel to OR, and OPQR shall be the top of the object at A, equal and parallel to its square base A 1 2 3.—In the same easy way the tops of all the other objects are formed.

When all the rest of the objects are delineated, shade them properly, and the whole perspective scheme will have the appearance of fig. 8. plate 135.

PROB. 16.—To put stairs with equal and parallel steps in perspective.

In fig. 2. of plate 136. let *a b* be the given breadth of each step, and *a i* the height thereof. Make *b c*, *c d*, *d e*, &c. each equal to *a b*; and draw all the upright lines *a i*, *b l*, *c n*, *d p*, &c. perpendicular to *a h* (to which the horizon *s*S is parallel); and from the points *i*, *l*, *n*, *p*, *r*, &c. draw the equidistant lines *i* B, *l* C, *n* D, &c. parallel to *a h*; these distances being equal to that of *i* B from *a h*.

Draw *x i* touching all the corner-points *l*, *n*, *p*, *r*, *t*, *v*; and draw 2 16 parallel to *x i*, as far from it as you want the length of the steps to be.

Toward the point of sight S draw the lines *a* 1, *i* 2, *k* 3, *l* 4, &c. and draw 16 15, 14 13, 12 11, 10 9, 8 7, 6 5, 4 3, and 2 1, all parallel to A *h*, and meeting the lines *w* 15, *u* 13, *s* 11, &c. in the points 15, 13, 11, 9, 7, 5, 3, and 1: then from these points draw 15 14, 13 12, 11 10, 9 8, 7 6, 5 4, and 3 2, all parallel to *h a*; and the outlines of the steps will be finished. From the point 16, draw 16 A parallel to *b a*, and A *a* 16 will be part of the flat at the top of the uppermost step. This done, shade the work as in fig. 3, and the whole will be finished.

PROB. 17.—To put stairs with flats and openings in perspective, standing on a horizontal pavement of squares.

In fig. 4. plate 136. having made S the point of sight, and drawn a reticulated pavement AB with black-lead lines, which may be rubbed out again; at any distance of the side AB of the pavement which is nearest to the eye, and at any point where you choose to begin the stair at that distance, as *a*, draw G *a* parallel to BA, and take *a b* at pleasure for the height of each step.

Take *a b* in your compasses, and set that extent as many times upward from F to E as is equal to the first required number of steps O, N, M, L, K; and from these points of division in EF draw 1 *b*, 2 *d*, 3 *f*, 4 *h*, and E*k*, all equidistant from one another, and parallel to F *a*: then draw the equidistant upright lines *a b*, *t d*, *u f*, *v h*, *w k*, and I *m*, all perpendicular to F *a*; then draw *m b*, touching the outer corners of these steps at *m*, *k*, *h*, *f*, *d*, and *b*; and draw *n s* parallel to *m b*, as far from it as you want the length of the steps K, L, M, N, O to be.

Towards the point of sight S draw *m n*, *l* 5, *k o*, *i* 6, *h p*, *f q*, *d r*, and *b s*. Then (parallel to the bottom line BA) through the points *n*, *o*, *p*, *q*, *r*, *s*, draw *n* 8; 5, 14; 6, 15; 7, 16; 1, 17; and 2 *s*: which done, draw *n* 5 and *o* 6 parallel to *l m*, and the outlines of the steps K, L, M, N, O will be finished.

At equal distances with that between the lines marked 8 and 14, draw the parallel lines above marked 9, 10, 11, 12 and 13; and draw perpendicular lines upwards from the points *n*, *o*, *p*, *q*, *r*, *s*, as in the figure.

Make H *m* equal to the intended breadth of the flat above the square opening at the left hand, and draw HW toward the point of sight S, equal to the intended length of the flat; then draw WP parallel to H *m*, and the outlines of the flat will be finished.

Take the width of the opening at pleasure, as from F to C, and draw CD equal and parallel to FE. Draw GH parallel to CD, and the short lines marked 33, 34, &c. just even with the parallel lines 1, 2, &c. From the points where these short lines meet CD draw lines toward the point of sight S till they meet DE; then from the points where the lines 38, 39, 40, &c. of the pavement meet C *y*, draw upright lines parallel to CD, and the lines which form the opening will be finished.

The steps P, Q, R, S, T, and the flat U above

the arch V, are done in the same manner with those in fig. 2. as taught in prob. 16. and the equidistant parallel lines marked 18, 19, &c. are directly even with those on the left hand side of the arch V, and the upright lines on the right-hand side are equidistant with those on the left.

From the points where the lines 18, 19, 20, &c. meet the right-hand side of the arch, draw lines toward the point of sight S; and from the points where the pavement lines 29, 30, 31, 32, meet the line drawn from A towards the point of sight, draw upright lines toward the top of the arch.

Having done the top of the arch, as in the figure, and the few steps to the right hand thereof, shade the whole as in fig. 5. and the work will be finished.

By drawing these examples frequently over, to a large scale, and reflecting upon them with attention, the student will become familiar with their use; and as they include the cases which most frequently occur, he will necessarily find great benefit from the knowledge of them.

The practical part of perspective is only the application of these rules to the actual description of objects. But as this part is purely mathematical, its assistance towards drawing is alone what can be performed by rule and compass, and can therefore strictly serve only for finding the images of points, of which they are composed; and, as these are infinite, it is endless to find them all by the strict rules; whence it becomes necessary after a sufficient number of them are found, to complete the image by the help of drawing, to the better effecting of which these points serve as a guide. Thus, when a circle is to be described, the practical rules serve to find a sufficient number of points in the circumference; which, being neatly joined by hand, will perfect the image, so that, in strictness, nothing in this image is found by mathematical rules, save the few particular points; the rest owes its being to the hand of the drawer.

Thus, also, if any complicated figure is proposed, it may not be easy to apply the practical rules to the description of every minute part: but by inclosing that figure in a regular one, properly subdivided and reduced into perspective, that will serve as a help, whereby a person skilled in drawing may with ease describe the object proposed. Upon the whole, where the boundaries of the proposed objects consist of straight lines and plane surfaces, they may be described directly by the rules of perspective; but when they are curvilinear, either in their sides or surfaces, the practical rules can only serve for the description of such right-lined cases as may conveniently inclose the objects, and which will enable the designer to draw them within those known bounds with a sufficient degree of exactness.

It is therefore in vain to seek, by the practical rules of perspective, to describe all the little hollows and prominences of objects, the different light and shades of their parts, or their smaller windings and turnings; the infinite variety of the folds in drapery; of the boughs and leaves of trees, or the features and limbs of men and animals; much less to give them that roundness and softness, that force and spirit, that easiness and freedom of posture, that expression and grace, which are requisite to a good picture. Perspective must content itself with its peculiar province of exhibiting a kind of rough draught to serve as a ground-work, and to ascertain the general proportions and places of the objects, according to their supposed situations; leaving the rest to be finished, beautified, and ornamented, by a hand skilful in drawing.

It is true, perspective is of most use where it is most wanted, and where a deviation from its rules would be the most observable; as in describing all regular figures, pieces of architecture, and other objects of that sort, where the particular tendency of the several lines is most remarkable; the rule and compass in such cases being much more exact than any description made by hand: but still the figure, described by the perspective rules, will need many helps from drawing; the capitals, and other ornaments of pillars, and their entablatures, the strength of light and shade, the apparent roundness and protuberance of the several parts, must owe their beauty and finishing to the designer's hand; but with regard to such objects as have no constant and certain determinate shape or size, such as clouds, hills, trees, rivers, uneven grounds, and the like, there is a much larger latitude allowable, provided the general bulk, or usual natural shape of those objects, are in some measure observed, so as not to make them appear unnatural or monstrous. See **Drawing**.

But although the strict practical rules of perspective are in a great measure confined to the description of right-lined figures, yet the knowledge of the general laws of that science is of great and necessary use to inform the judgment, after what manner the images of any proposed lines should run, which way they should tend, and where terminate; and thereby enables it the better to determine what appearance any objects ought to put on, according to their different situations and distances; it accustoms the eye to judge with greater certainty of the relations between real objects and their perspective descriptions, and the hand to draw the same accordingly; and directs the judgment readily to discover any considerable error therein which might otherwise escape notice. Besides that, when the ground, or general plan, and the principal parts of a picture, are first laid down according to the rules, every thing else will more naturally fall in with them, and every remarkable deviation from the just rules will be the more readily perceived, and the easier avoided or rectified; so that although it may be infinitely tedious, or absolutely impracticable, to describe every minute part of a picture by the strict mechanical rules, yet the employing them, where they can be the most commodiously used, will give the picture in general such a look, as will guide the artist in drawing the other parts without any obvious inconsistency.

When a painter has formed a scene in his mind, and supposed, as it is customary, that the capital figures of this scene lie close, or almost close, to the back of his canvass, he is, in the next place, to fix upon some point on this side of the canvass, from which he would choose his piece should be seen. But in choosing this point, which is called the point of sight, regard should be had to its situation to the right or left of the middle of the canvass; but, above all things, to its distance and its height with respect to the lower edge of the canvass; which edge is called the base-line, and is parallel with the horizontal line that passes through the eye. For by assuming the point of sight, and consequently the horizontal line, too low, the planes upon which the figures stand will appear a great deal too shallow; as, by assuming it too high, they will appear too steep, so as to render the piece far less light and airy than it ought to be. In like manner, if the point of sight is taken at too great a distance from the canvass, the figures will not admit of degradation enough to be seen with suffi-

cient distinctness; and if taken too near it, the degradation will be too quick and precipitate to have an agreeable effect. Thus, then, it appears, that no small attention is requisite in the choice of this point.

When a picture is to be placed on high, the point of sight should be assumed low, and *vice versa*; in order that the horizontal line of the picture may be, as near as possible, in the same horizontal plane with that of the spectator; for this disposition has an amazing effect. When a picture is to be placed very high, as, amongst many others, that of the Purification by Paolo Veronese, engraved by Le Fevre, it will be proper to assume the point of sight so low, that it may lay quite under the picture, no part of whose ground is, in that case, to be visible; for, were the point of sight to be taken above the picture, the horizontal ground of it would appear sloping to the eye, and both figures and buildings as ready to tumble head foremost. It is true, indeed, that there is seldom any necessity for such extraordinary exactness; and that unless in some particular cases, the point of sight had better be rather high than low: the reason of which is, that, as we are more accustomed to behold people on the same plane with ourselves, than either higher or lower, the figures of a piece must strike us most when standing on a plane nearly level with that upon which we ourselves stand. To this it may be added, that by placing the eye low, and greatly shortening the plane, the heels of the back figures will seem to bear against the heads of the foremost, so as to render the distance between them far less perceptible than otherwise it would be.

The point of sight being fixed upon according to the situation in which the picture is to be placed, the point of distance is next to be determined. In doing this, a painter should carefully attend to three things: first, that the spectator may be able to take in, at one glance, the whole and every part of the composition; secondly that he may see it distinctly; and thirdly, that the degradation of the figures and other objects of the picture be sufficiently sensible.

But there is a particular still remaining, which will not admit of the least latitude. This is the delineation of the picture, when once the point of sight has been fixed upon. The figures of a picture are to be considered as so many columns erected on different spots of the same plane; and the painter must not think of designing any thing, till he has laid down, in perspective, all those columns which are to enter his composition, with the most scrupulous exactness. By proceeding in this manner, he may not only be sure of not committing any mistake in the diminution of his figures according to their different distances, but may flatter himself with the thoughts of treading in the steps of the greatest masters. It is to the punctual observance of these laws that we are to attribute the grand effect of some paintings by Carpazio and Mantegna, so careless in other respects; whereas a single fault against them is often sufficient entirely to spoil the works of a Guido, in spite of the sublimity and beauty of his superior style.

Perspective (Aerial), is the art of giving a due diminution or degradation to the strength of the light, shade, and colours of objects, according to their different distances, the quantity of light which falls on them, and the medium through which they are seen.

As the eye does not judge of the distance of objects entirely by their apparent size, but also by their strength of colours, and distinction of parts; so it is not sufficient to give an object its due apparent bulk according to the rules of stereography unless at the same time it be expressed with that proper faintness and degradation of colour which the distance requires. Thus if the figure of a man, at a distance, were painted of a proper magnitude for the place, but with too great a distinction of parts, or too strong colours, it would appear to stand forward, and seem proportionally less, so as to represent a dwarf situated nearer the eye, and out of the plane on which the painter intended it should stand.

By the original colour of an object is meant that colour which it exhibits to the eye when duly exposed to it in a full open uniform light, at such a moderate distance as to be clearly and distinctly seen. This colour receives an alteration from many causes, the principal of which are the following.

1. From the objects being removed to a greater distance from the eye, whereby the rays of light which it reflects are less vivid, and the colour becomes more diluted and tinged, in some measure, by the faint bluish cast, or with the dimness or haziness of the body of air through which the rays pass.

2. From the greater or less degree of light with which the object is enlightened; the same original colour having a different appearance in the shades, from what it has in the light, although at an equal distance from the eye, and so in proportion to the strength of the light or shade.

3. From the colour of the light itself which falls upon it, whether it be from the reflection of coloured light from any adjacent object, or by its passage through a coloured medium, which will exhibit a colour compounded of the original colour of the object, and the other accidental colours which the light brings with it.

4. From the position of the surface of the object, or of its several parts with respect to the eye; such parts of it appearing more lively and distinct than those which are seen obliquely.

5. From the closeness or openness of the place where the object is situated; the light being much more variously directed and reflected within a room than in the open air.

6. Some original colours naturally reflect light in a greater proportion than others, though equally exposed to the same degrees of it; whereby their degradation at several distances will be different from that of other colours which reflect less light.

Perspective machines, or contrivances for designing or drawing in perspective, are of various kinds. We shall here describe three or four of the most useful. See also Camera obscura and Lucida.

Provide a square piece of glass fitted into a frame ABDC (fig. 1, pl. 137); and wash and smear it over with water in which a little gum has been dissolved. When it is well dried again, turn it towards the object or objects to be designed, so that the whole may be seen through a dioptra or sight, GH. Then applying the eye to the sight, with a pen and ink draw every thing on the glass, as you see it appear thereon: or the outlines of the objects may be drawn with black colour in drying oil. Having finished the draught, lay a fair moist paper thereon; and, pressing it pretty tight down, the whole will be transferred from the glass to the paper. This method is very good, easy, and exact, and deserves to be more used by painters. Some have used a piece of tiffany or fine lawn; and others, paper made transparent by means of oil of

turpentine, instead of the glass; and the outlines of the object are traced out by a crayon, formed of white or red chalk, charcoal, or any proper substance. If tiffany or lawn be used, they must be carefully laid on paper or vellum, and struck in every part with some flat body, by which means the matter of the crayon will be transferred from the old to the new ground; and the impression should be overtraced with a black-lead pencil. The sketch on transparent paper may be transmitted to any ground, by puncturing it with holes near each other in the lines of the drawing, then fixing it on the ground, and dusting over it black lead, or any other coloured matter finely powdered, and tied up in a fine linen cloth. This dust will mark the sketch on the new ground, so that it may be overtraced by any kind of pencil or crayon.

Fig. 2, pl 137, shows sir Christopher Wren's apparatus. A is a small sight, with a short arm B, which may be turned round about, and moved up and down on the small cylinder CD, which is screwed into ED at D; this piece ED moving round about the centre E, by which means the sight may be removed either towards E or F. EF is a ruler fastened on the two rulers GG, which rulers serve both to keep the square frame SSSS perpendicular, and, by sliding through the square holes TT, to stay the sight, either nearer to or farther from the said frame; on which frame is stuck on with a little wax the paper OOOO, on which the picture is to be drawn by the pen I. This pen I is so fixed by a small brass handle V, to the ruler HH, that the point I may be kept very firm, so as always to touch the paper. HH is a ruler, that is always moved horizontally, or parallel to itself, by means of the small strings *a a a*, *b b b*; at the end of this ruler is stuck a small pin, whose head P is the sight, which is to be moved up and down on the outlines of any object. The two strings *a a a*, *b b b*, are exactly of an equal length. Two ends of them are fastened into a small leaden weight which is moved in a socket on the back-side of the frame, and serves exactly to counterpoise the ruler HH the other two ends are fastened to two small pins HH, after they have rolled about the small pullies MM, LL, KK; by means of which pullies, if the pen I be taken hold of and moved up and down the paper, the strings moving very easily, the ruler will always remain in an horizontal position. When the instrument is used, it is set upon a table, and the sight A is fixed at any height above the table, and at any distance from the frame SSSS, at pleasure. Then the designer, looking through the sight A, and holding the pen I in his hand, moves the head of the pin P up and down over the outlines of the object, and the point I will describe, on the paper OOOO, the shape of the object so traced.

Dr. Bevis's machine (described by Ferguson) is exhibited in figs. 3 and 4, pl. 137. *a b e f* (fig. 3) is an oblong square board, represented by ABEF in fig. 4; *x* and *y* (X and Y) are two hinges on which the part *c l d* (CLD) is moveable. This part consists of two arches or portions of circles *c m l* (CML) and *d n l* (DNL) joined together at the top *l* (L) and at bottom to the cross bar *d c* (DC) to which one part of each hinge is fixed; and the other part to a flat board, half the length of the board *a b e f* (ABEF) and glued to its uppermost side. The centre of the arch *c m l* is at *d*, and the centre of the arch *d n l* is at *c*.

On the outer side of the arch *d n l* is a sliding piece *n* (much like the nut of the quadrant of altitude belonging to a common globe) which may be moved to any part of the arch between *d* and *l*: and there is such another slider *o* on the arch *c m l*, which may be set to any part between *c* and *l*. A thread *c p n* (CPN) is stretched tight from the centre *c* (C) to the slider *n* (N), and such another thread is stretched from the centre *d* (D) to the slider *o* (O); the ends of the threads being fastened to these centres and sliders.

Now it is plain, that by moving these sliders on their respective arches, the intersection *p* (P) of the threads may be brought to any point of the open space within the arches. In the groove *k* (K) is a straight sliding bar *i* (I) which may be drawn farther out, or pushed farther in at pleasure.

To the outer end of this bar I (fig 4) is fixed the upright piece HZ, in which is a groove for receiving the sliding piece 2. In this slider is a small hole *r* for the eye to look through, in using the machine: and there is a long slit in HZ, to let the hole *r* be seen through when the eye is placed behind it, at any height of the hole above the level of the bar I.

In delineating a perspective representation, e. g. of the house, *q s r p*, a great way off, place the machine on a steady table, with the end EF of the horizontal board ABEF toward the house, so that, when the Gothic-like arch DLC is set upright, the middle part of the open space (about P) within it may be even with the house when you place your eye at Z, and look at the house through the small hole *r*. Then fix the corners of a square piece of paper with four wafers on the surface of that half of the horizontal board which is nearest the house; and all is ready for drawing.

Set the arch upright, as in the figure, which it will be when it comes to the perpendicular side *t* of the upright piece *s t* fixed to the horizontal board behind D. Then place your eye at Z, and look through the hole *r* at any point of the house, as *q*, and move the sliders N and O till you bring the intersection of the threads at P directly between your eye and the point *q*: then put down the arch flat upon the paper on the board, as at ST, and the intersection of the threads will be at W. Mark the point W on the paper with the dot of a black lead pencil and set the arch upright again, as before: then look through the hole *r*, and move the sliders N and O till the intersection of the threads come between your eye and any other point of the house, as *p*: then put down the arch again to the paper, and make a pencil-mark thereon at the intersection of the threads, and draw a line from that mark to the former one at W; which line will be a true perspective representation of the corner *p q* of the house.

Proceed in the same manner, by bringing the intersection of the threads successively between your eye and other points of the outlines of the house, as *r*, *s*, &c. and put down the arch to mark the like points on the paper, at the intersection of the threads: then connect these points by straight lines, which will be the perspective outlines of the house. In like manner find points for the corners of the door and windows, top of the house, chimnies, &c. and draw the finishing lines from point to point: then shade the whole, making the lights and shades as you see them on the house itself, and you will have a true perspective figure of it. Great care must be taken, during the whole time, that the position of the machine be not shifted on the table; and to prevent such an inconvenience, the table should be very strong and steady, and the machine fixed to it, either by screws or clamps.

In the same way, a landscape, or any number of objects within the field of view through the arch, may be delineated, by finding a sufficient number

of perspective points on the paper, and connecting them by straight or curved lines as they appear to the eye.

The arch ought to be at least a foot wide at bottom, that the eye at Z may have a large field of view through it; and the eye should then be at least $10\frac{1}{2}$ inches from the intersection of the threads at P when the arch is set upright. For if it be nearer, the boundaries of view at the sides near the foot of the arch will subtend an angle at Z of more than sixty degrees, which will not only strain the eye, but will also cause the outermost parts of the drawing to have a disagreeable appearance. To avoid this, it will be proper to draw back the sliding bar I, till Z be $14\frac{1}{2}$ inches distant from P; and then the whole field of view, through the foot-wide arch, will not subtend an angle to the eye at Z of more than forty-five degrees; which will give a more easy and pleasant view, not only of all the objects themselves, but also of their representations on the paper whereon they are delineated.

So that, whatever the width of the arch be, the distance of the eye from it should be in this proportion: as 12 is to the width of the arch, so is $14\frac{1}{2}$ to the distance of the eye (at Z) from it.

If a pane of glass, laid over with gum water, be fixed into the arch, and set upright when dry, a person that looks through the hole *r* may delineate the objects upon the glass which he sees at a distance through and beyond it, and then transfer the delineation to a paper put upon the glass.

Mr. Kirby has also contrived and described an instrument, that will be useful in taking extensive views, &c. The ruler AB (fig. 5. pl. 137) is nineteen inches long, and is graduated into nineteen equal parts; it has a dove-tail groove on its upper edge to receive the perpendicular ruler G, which has one end fitted to it, so as to slide very easily: this ruler is fourteen inches long, and is divided into fourteen equal parts, and upon the back side of it F is a line drawn exactly in the middle, to which is fixed a silken line with a small plummet at the end. The ruler AB is fixed by two screws *a*, *c* to two pieces of thin brass; and these pieces of brass are fixed at the other ends by two screws *d*, *e*, to a stronger piece of brass *b f*, which goes close to the ruler AB, and has a joint at X turning upon a screw: below this joint is a piece of round brass about six inches long, which goes into a hole made in the top of the staff, and may be raised higher or lower, by means of a screw S: CDE represents part of this staff, the whole length of which is about three feet, and at the bottom is a rank screw made of iron and fixed to the staff. HI is a wire twenty-two inches long, with a screw at *h* to go into the hole *b*; the piece of brass wire, bent into the form *i k*, is fixed to the wire HI by the screw *k*; and the part *i* goes into the hole *f* in the brass-piece *b f*. The small wire KL is about twelve inches long, and flatted at K, at which place is a little hole above one-eighth of an inch in diameter; this wire KL is fitted to the holes *l*, *m*, *n*, *o*, which are made in the larger wire HI, and it may be placed higher or lower by means of a small screw. This instrument is used in the following manner: fix a paper upon a drawing board, as in fig. 6, and divide the paper lengthways into nineteen equal parts, and perpendicularly into fourteen equal parts; making these divisions greater or smaller according to your design. Then take the staff, and fix it strongly in the ground, by means of the screw at bottom, and at a convenient distance from the prospect which you intend to take. After this, put the instrument together as in fig. 7, and fix the ruler AB exactly horizontal by means of the plummet on the perpendicular ruler and the brass joint X; then fix the wire KL, so as to have the eye-hole exactly level with the horizon or equal to the height of the eye, and take care to have the greatest distance of the eye-hole from the ruler equal to the whole length of the longest ruler AB, and never less than the distance *h l*. Having thus fixed the instrument, proceed to make the drawing; look through the eye-hole, and then move the perpendicular ruler in the groove, till you get one edge exactly against some principal object; then will the parts upon the ruler show how high the object is from the bottom of the ruler, i. e. from the bottom of the picture, and you will also know its apparent height; therefore transfer this to the paper in those squares which correspond with the divisions upon the rulers. For the breadth of objects, move the perpendicular ruler so as to be even with the sides of an object, and the divisions upon the lower ruler will show their apparent breadths. After the same manner, get the places and apparent sizes of as many principal objects as are necessary for assisting you in completing the whole drawing, which may be done by this method with great exactness. When the drawing is finished, the instrument may be taken to pieces and put into a box, which may serve as a drawing board; the top M may be screwed into the staff, which will serve as a walking-stick, and the stool to sit on may be made very portable; so that every part of this apparatus may be carried by one person without any inconvenience.

Descriptions of other instruments for drawing in perspective may be seen in Talbot's Surveying, and Nicholson's Journal, No. 4, N. S.

PERSPECTIVE GLASS, a small telescope.

PE'RSPECTIVE. *a.* Relating to the science of vision; optic; optical (*Bacon*).

PERSPICA'CIOUS. *a.* (*perspicax*, Latin.) Quicksighted; sharp of sight (*Brown*).

PERSPICA'CIOUSNESS *s.* (from *perspicacious*.) Quickness of sight (*Brown*).

PERSPICA'CITY. *s.* (*perspicacité*, Fr.) Quickness of sight (*Brown*).

PERSPI'CIENCE. *s.* (*perspiciens*, Latin.) The act of looking sharply.

PE'RSPICIL. *s.* (*perspicillum*, Latin.) A glass through which things are viewed; an optic glass (*Crashaw*).

PERSPICU'ITY. *s.* (*perspicuité*, French.) 1. Transparency; translucency; diaphaneity (*Brown*). 2. Clearness to the mind; easiness to be understood; freedom from obscurity or ambiguity (*Locke*).

PERSPI'CUOUS. *a.* (*perspicuus*, Latin.) 1. Transparent; clear; such as may be seen through; diaphanous; translucent (*Peacham*) 2. Clear to the understanding; not obscure; not ambiguous (*Sprat*).

PERSPI'CUOUSLY. *ad.* (from *perspicuous*.) Clearly; not obscurely (*Bacon*).

PERSPI'CUOUSNESS. *s.* (from *perspicuous*.) Clearness; freedom from obscurity.

PERSPI'RABLE. *a.* (from *perspire*.) 1. Such as may be emitted by the cuticular pores (*Arbuthnot*). 2. Perspiring: not proper.

PERSPIRATION. The vapour that is secreted by the extremities of the cutaneous arteries from the external surface of the body. It is distinguished into sensible and insensible. The former is separated in the form of an invisible vapour, the latter so as to be visible in

the shape of very little drops adhering to the epidermis. The secretory organ is composed of the extremities of the cutaneous arteries. The smell of the perspirable fluid, in an healthy man, is fatuous and animal; its taste manifestly salt and ammoniacal. In consistence it is vaporous and aqueous; and its specific gravity is greater than water. For the most part it is yellowish, from the passage of the subcutaneous oil, and sebaceous matter of the subcutaneous glands. Sometimes it is reddish, from the globules of the cruor passing through, especially under the axillæ. The quantity is sometimes so profuse, as not only conspicuously to moisten the linen, but also the thicker garments. The cutaneous arteries from which the perspirable matter is secreted are easily shown by injecting water or isinglas into the arteries; for then, from all parts of the skin, an infinite number of small drops exude, which being effused under the cuticle, rendered impervious by death, raise it up in blisters.

During life, this exhalation is demonstrated in many ways. A bright mirror, when held near the warm and naked skin, is quickly obscured by a moist vapour. In subterraneous caverns, where the air is denser, it most evidently escapes in the air, from the whole surface of the body, in the form of visible and thick clouds.

In man, and in some, though not in all animals, whenever the motion of the blood is increased, while at the same time the skin is hot and relaxed, from the small cutaneous pores, instead of an invisible vapour, sweat exudes in the form of minute, but visible drops, which, with others of the same kind, run together into larger drops. The hottest parts are most subject to sweat, as the head, breast, and folds of the body. The experiment before mentioned, together with the simplicity of nature, the visible density of the cutaneous and pulmonary exhalation, persuades us, that sweat is discharged through the same vessels which are the organs of perspiration, and that it differs only in its quantity and celerity, and by the admixture of the liquor of the sebaceous glands, and the subcutaneous oil, which being diluted by the more plentifully secreted arterial fluid, exude of an oily and yellow consistence, and chiefly cause the smell and colour of the sweat. Hence, it is more fetid and yellower in the armpits and groins, where those glands are most numerous. Both blood and small sand have escaped from the skin along with the sweat.

The nature of perspiration must be investigated by experiments, and by its analogy with the pulmonary exhalation, which, in like manner, but more frequently, becomes visible in a cold air. That this exhalation is chiefly water, has been proved by experiments, in which the breath, being received into l ge vessels, has condensed into watery drops. This is confirmed by the tenuity of the cloud on the mirror, and its volatility, and by the familiar change of the perspired matter, when obstructed, into a diuresis or diarrhœa, and from the easy determination of warm liquors to assume the form of perspiration by heat, or of urine by cold. This water is derived from our drink, which furnishes a great part of the perspiration, and from inhalation. Frequently, even the odours of our aliments may be plainly perceived in the perspiration; there is also an admixture of the electrical matter in every person, and in some it is evidently lucid.

That it also contains some volatile particles of an alkaline nature is evident, both from the nature of our blood, and from the considerable evils which succeed the retention of the perspiration, most conspicuously in acute diseases, when, by being repelled inward, it renders the urine pale, and from the corruption of the air by respiration. This volatile alkaline matter arises from the particles of the blood, attenuated by perpetual heat and trituration, and changed into an acrimonious nature. Dogs trace these odours, and could not know their masters unless something of a particular nature were perspired from each person.

The quantity of matter perspired is very large, whether we consider the extent of the organ secreting it, the quantity of vapour exhaled by the lungs alone, or the experiments of Sanctorius, by which it would seem, that of eight pounds of food and drink, five pounds, or according to other experiments in a colder country, from fifty-six to thirty ounces are perspired, which neither add to the weight of the body, nor escape by any visible excretion except the saliva, sweat, and mucus of the nose. But the cutaneous exhalation is even much larger than this; since it not only throws off such a proportion of the alimentary matters, but likewise redischarges what the blood requires by inhalation. In this, however, the different states of the air, and of the body, have great influence. In warm countries, in the summer-months, and in young active persons, more goes off by perspiration, and less by the urine. But in cold climates, during the temperate and winter seasons, in aged or inactive persons, more goes off by the urine than by the insensible perspiration. In temperate countries, making a computation throughout the whole year, something more is perspired than what passes off by urine; and, by collating all the experiments made in different countries, both excretions are almost alike. It is also somewhat affected by the difference of time after eating; and the law which seems to obtain, is, that the perspiration is most copious at that time when the alimentary matters, being mostly digested, and received into the blood, are fitted for exhalation. It is naturally diminished during sleep, even in the warmest climates; but it is increased by the heat of the bed-clothes.

In general a plentiful and equable perspiration, at the same time that the body is strong, are good signs of health; for excessive perspiration, when conjoined with debility, is observed to do more mischief than its entire suppression, if what has been written on this subject is sufficiently to be depended on. It is a sign of health, because it denotes the perviousness of the vessels dispersed throughout

the whole body, and the complete digestion of the aliments, of which a great part is resolved into halitus. When it is diminished, it indicates constriction of the skin, weakness of the heart, and imperfect digestion. When excessive, it perhaps wastes the nervous spirits. This discharge is, by moderate exercise, increased to six times that of a person at rest, to the extent of a pound in an hour, or even in half an hour. It is farther increased, if aided by strong and open vessels, by warm, watery, and cordial drinks, by food of easy digestion, by a dense and temperate atmosphere, and by cheerfulness. It is diminished or suppressed by the contrary causes; as a dense skin, a moist, or a cold and dry atmosphere, rest, an increased flow of urine, the supervention of a diarrhœa; and lastly, nervous agitation, from a disagreeable affection of the mind. However, the continuance of life does not depend so intimately on this discharge which is so easily, and without bad consequences, increased or diminished by slight causes; and is so inconsiderable, in many nations, anointing their skins with oil, and in many animals. When by being suppressed, it produces such bad effects in fevers of a bad kind, it hurts chiefly by the putrescent particles, which are retained by the perspiration being suppressed.

The sweat is evidently of a saline nature; as appears both from its taste and from the crystals which form upon the clothes of glass-blowers; and by distillation, which demonstrates its alkaline nature. Hence, by this discharge, the miasms of the most pestilential diseases are frequently expelled. But, in reality, sweat is always a preternatural discharge, and ought never to exist in a healthy person, unless by violent bodily exercise he have induced a temporary disease. It also is frequently injurious in acute diseases; by wasting the water of the blood, so that the rest becomes thicker, and the salts more acrimonious. By violent exercise, or the heat of the climate, the sweat is extremely fetid; and even sanguineous: being electrical, it sometimes is lucid.

The uses of perspiration are, to free the blood of its redundant water, of its alkaline impurities, rendered more acrid by repeated circulations; and of an extremely volatile oil, probably prepared from the same blood. The same perspiration likewise qualifies and softens the cuticle, and preserves the necessary softness of the papillæ.

But the same skin, which has vessels exhaling into the air, is likewise replenished with vessels, which absorb thin vapours from the air, either perpetually, or at least in a moderate degree of cold; in a moist atmosphere; in the night-time, when the body is at rest, the mind depressed, and under circumstances, contrary to those mentioned above, which increase perspiration. These veins are demonstrated by anatomical injections, which, if thin or watery, exude through them in the same manner as through the arteries: moreover, by the manifest operations of medicines, diffused in the air, or applied to the skin: of vapours, mercury, turpentine, saffron; of baths, mercurial plasters, tobacco, coloquintida, opium, cantharides, arsenic; by the fatal effects of poisons, absorbed by the skin; as the venereal poison; by the living of animals, without drink, in hot but humid islands; by the perspiration and urine being sufficiently copious in such situations, without much drink; and lastly, by extraordinary morbid cases, in which the quantity of urine discharged has far exceeded the drink taken in; in which it is probable, that the inhaling pores were more open; for that new ones were generated, is not credible. It is difficult to ascertain its quantity; that it is very great in plants in the night-time, is proved by certain experiments.

Both the exhaling and inhaling vessels may be contracted and relaxed by the nervous power. This appears from the effects of the passions of the mind; which, if lively and exhilarating, relax the exhaling vessels, by increasing the impulse of the influx of blood; and by the remission of the nerves; hence redness, moisture, and turgescence of the skin. Those passions which are languid and depressing contract the exhaling vessels: as appears from the dryness of the skin, produced by them; from the goose-skin, by terror; and from diarrhœa, caused by fear. They also seem to dilate the inhaling vessels, whence fear facilitates the action of the small-pox and the plague.

The constituent principles of the perspirable fluid appear to be, 1. Water, attenuated into vapour, by the matter of heat. 2. Animal gass, or carbonated hydrogen. As the production of carbonated air with the oxygen of the atmosphere shews. 3. Azotic gass. For water in which a man has bathed soon becomes putrid. Carbonated hydrogen, chemically combined with azot, would appear to constitute putrid miasm. May not this be the origin of putrid fever, in those narrow confined chambers in which there are many persons? 4. The glandular smegma and subcutaneous oil; hence linen is stained with a yellowish colour, and leanness is brought on. 5. The serum of the blood. This affords an immense quantity of water, and the albuminous and saline part of the sweat. It makes the linen of a viscid rigidity, and of a salt taste. Glass-blowers sometimes excrete so acrid a sweat, that salt has been seen collected in crystals on their faces.

Perspiration varies in respect to, 1. The temperature of the atmosphere. Thus men have a more copious, viscid, and higher coloured sweat on summer days, and in warm countries, than in colder regions. 2. Sex. The sweat of a man is said to smell more acrid than that of a woman. 3. Age. The young are more subject to sweat than the aged, who during the excessive heat of the summer scarcely sweat at all. 4. Ingesta. An alliacious sweat is perceived from eating garlic; a leguminous from peas; an acid from acids; a fetid from animal food only; and a rancid sweat from fat foods, as is observed in Greenland. A long abstinence from drink causes a more acrid and coloured sweat; and the drinking a great quantity of cold water in summer, a limpid and thin sweat. 5. Medicines. The sweat of those

who have taken musk, even moderately, and assafœtida, or sulphur, smells of their respective natures. 6. Region of the body. The sweat of the head is greasy; on the forehead it is more aqueous; under the axillæ very unguinous; and in the interstices of the toes it is very fetid, forming in the most healthy man blackish sordes. 7. Diseases. In this respect it varies very much, in regard to quantity, smell, and colour; for the sweat of gouty persons is said to turn vegetable juices to a red colour, and is of a cretaceous nature. Some men also have a lucid sweat, others a sweat tinging their linen of a cærulean colour.

The uses of the insensible perspiration are, 1. To liberate the blood from superfluous animal gass, azot, and water. 2. To eliminate the noxious and heterogeneous excrements; hence the acid, rancid, leguminous, or putrid perspiration of some men. 3. To moisten the external surface of the body, lest the epidermis, cutis, and its nervous papillæ be dried up by the atmospheric air. 4. To counter-balance the suppressed pulmonary transpiration of the lungs; for when it is suppressed, the cutaneous is increased: hence the nature of both appears to be the same.

The use of the sensible perspiration or sweat, in an healthy man, is scarcely observable, unless from an error of the six non-naturals. Its first effect on the body is always prejudicial, by exhausting and drying it; although it is sometimes of advantage. 1. By supplying a watery excretion: thus when the urine is deficient, the sweat is often more abundant. In this manner an aqueous diarrhœa is frequently cured by sweating. 2. By eliminating at the same time any morbid matter. Thus various miasms are critically expelled, in acute and chronic diseases, with the sweat.

PERSPI'RATIVE. *a.* (from *perspire.*) Performing the act of perspiration.

To PERSPI'RE. *v. n.* (*perspiro*, Latin.) 1. To perform excretion by the cuticular pores. 2. To be excreted by the skin (*Arbuthnot*).

To PERSTRI'NGE. *v. a.* (*perstringo*, Lat.) To graze upon; to glance upon.

PERSUA'DABLE. *a.* (from *persuade.*) Such as may be persuaded.

To PERSUA'DE. *v. a.* (*persuadeo*, Latin.) 1. To bring to any particular opinion (*Wake.*). 2. To influence by argument or expostulation. *Persuasion* seems rather applicable to the passions, and *argument* to the reason; but this is not always observed (*Sidney*). 3. To inculcate by argument or expostulation (*Taylor*). 4. To treat by persuasion: not in use (*Shakspeare*).

PERSUA'DER. *s.* (from *persuade.*) One who influences by persuasion; an importunate adviser (*Bacon*).

PERSUA'SIBLE. *a.* (*persuasibilis*, Lat.) To be influenced by persuasion (*Gov. of the Tongue*).

PERSUA'SIBLENESS. *s.* (from *persuasible.*) The quality of being flexible by persuasion.

PERSUA'SION. *s.* (*persuasion*, French; from *persuasus*, Latin.) 1. The act of persuading; the act of influencing by expostulation; the act of gaining or attempting the passions (*Otway*). 2. The state of being persuaded; opinion.

PERSUA'SIVE. *a.* (*persuasif*, French; from *persuade.*) Having the power of persuading; having influence on the passions (*Hooker*).

PERSUA'SIVELY. *ad.* (from *persuasive.*) In such a manner as to persuade (*Milton*).

PERSUA'SIVENESS. *s.* (from *persuasive.*) Influence on the passions (*Hammond*).

PERSUA'SORY. *a.* (*persuasorius*, Latin.) Having the power to persuade (*Brown*).

PERT. *a.* (*pert*, Welsh.) 1. Lively; brisk; smart (*Milton*). 2. Saucy; petulant; with bold and garrulous loquacity (*Collier*).

To PERTA'IN. *v. n.* (*pertineo*, Latin.) To belong; to relate (*Peacham*).

PERTEREBRA'TION. *s.* (*per* and *terebratio*, Lat.) The act of boring through (*Ainsworth*).

PERTH, the capital of Perthshire, with two churches, one of which belonged formerly to a fine abbey. It has been the residence of the sovereigns of Scotland, and the seat of the parliament and of the supreme courts of justice. The tide comes up to this place, and the river is navigable for small vessels. Here is a great linen and cotton manufacture. In 1801 the inhabitants amounted to 14,878. Perth is seated on the Tay, over which is a bridge, 30 miles N. of Edinburgh. Lon. 3. 27 W. Lat. 56. 22 N.

PERTHSHIRE, a county of Scotland, bounded on the N. by the shires of Inverness and Aberdeen; on the E. by Angusshire and the frith of Tay; on the S. by the counties of Fife, Kinross, Clackmannan, and Stirling; and on the W. by Argyleshire. It extends 60 miles from E. to W. and nearly the same from N. to S. The northern district, called Athol, is mountainous, and contains some lakes. This county contains about 4,068,640 acres; and in 1801 had 126,366 inhabitants.

PERTH AMBOY, a seaport of the United States, in New Jersey, seated on a neck of land, between the river Raritan and Arthur Kull Sound. It lies open to Sandy Hook, and is one of the best harbours on the continent. It is 25 miles S.W. of New York. Lon. 75. 0 W. Lat. 40. 35 N.

PERTINA'CIOUS. *a.* (from *pertinax*, Lat.) 1. Obstinate; stubborn; perversely resolute (*Walton*). 2. Resolute; constant; steady (*South*).

PERTINA'CIOUSLY. *ad.* Obstinately; stubbornly (*King Charles*).

PERTINA'CITY. PERTINA'CIOUSNESS. *s.* (*pertinacia*, Latin; from *pertinacious.*) 1. Obstinacy; stubbornness (*Brown*). 2. Resolution; constancy.

PE'RTINACY. *s.* (from *pertinax*, Latin.) 1. Obstinacy; stubbornness; persistency. 2. Resolution; steadiness; constancy (*Taylor*).

PERTINAX (Publius Helvius), a Roman emperor after the death of Commodus. He was descended of an obscure family, and for some time followed the mean employment of making charcoal. Though indigent, he re-

ceived a liberal education, and he, for some time, taught the Greek and Roman language in Etruria. He left this profession for a military life, and by his valour gradually rose to the highest offices in the army, and was made consul by M. Aurelius, for his eminent services. He was afterwards entrusted with the government of Mœsia, and at last he presided over the city of Rome as governor. When Commodus was murdered, Pertinax was universally selected to succeed him. He acquiesced with reluctance, but his mildness and œconomy convinced the senate and the people of the prudence of their choice. After having made many salutary regulations in the state, and gained the affection of the worthiest and most discerning of his subjects, the extravagant and luxurious alone raised clamours against him, and when Pertinax attempted to introduce among the pretorian guards that discipline which was necessary to preserve the tranquillity of Rome, the minds of the soldiers became totally alienated. Pertinax was apprized of this mutiny, but he refused to fly at the hour of danger, and he scorned the advice of his friends who wished him to withdraw from the impending storm. He was assassinated by his soldiers, and his head was cut off and carried upon the point of a spear, as in triumph, to the camp. This happened on the 28th of March, A. D. 103. Pertinax reigned only 87 days, and by his death the Roman empire was robbed of a wise, virtuous, and benevolent emperor.

PE'RTINENCE. PE'RTINENCY. *s.* (from *pertineo*, Latin.) Justness of relation to the matter in hand; propriety to the purpose; appositeness (*Bentley*).

PE'RTINENT. *a.* (*pertinens*, Lat. *pertinent*, Fr.) 1. Related to the matter in hand; just to the purpose; not useless to the end proposed; apposite (*Bacon*). 2. Relating; regarding; concerning (*Hooker*).

PE'RTINENTLY. *ad.* (from *pertinent.*) Appositely; to the purpose (*Taylor*).

PE'RTINENTNESS. *s.* Appositeness.

PERTI'NGENT. *a.* (*pertingens*, Latin.) Reaching to; touching.

PE'RTLY. *ad.* (from *pert.*) 1. Briskly; smartly (*Pope*). 2. Saucily; petulantly (*Swift*).

PE'RTNESS. *s.* (from *pert.*) 1. Brisk folly; sauciness; petulance (*Pope*). 2. Petty liveliness; spriteliness without force, dignity, or solidity (*Watts*).

PERTRA'NSIENT. *a.* (*pertransiens*, Lat.) Passing over.

To PERTU'RB. *To* PERTU'RBATE. *v. a.* (*perturbo*, Lat.) 1. To disquiet; to disturb; to deprive of tranquillity (*Sandys*). 2. To disorder; to confuse; to put out of regularity (*Brown*).

PERTURBA'TION. *s.* (*perturbatio*, Lat.) 1. Disquiet of mind; deprivation of tranquillity (*Ray*). 2. Restlessness of passions (*Bacon*). 3. Disturbance; disorder; confusion; commotion (*Bacon*). 4. Cause of disquiet (*Shakspeare*). 5. Commotion of passions (*Ben Jonson*).

PERTURBA'TOUR. *s.* (*perturbator*, Lat.) Raiser of commotions.

PERTUIS, a town of France, in the department of the Mouths of the Rhone, 10 miles N. of Aix and 27 of Marseilles. Lon. 5. 36 E. Lat. 43. 44 N.

PERTU'SED. *a.* (*pertusus*, Lat.) Bored; punched; pierced with holes.

PERTU'SION. *s.* (from *pertusus*, Latin.) 1. The act of piercing or punching (*Arbuth.*). 2. Hole made by punching or piercing (*Bac.*).

PERTUSSIS. (from *per*, much, and *tussis*, cough.) The hooping cough. A genus of disease in the class neuroses, and order spasmi of Cullen, known by a convulsive strangulating cough, with hooping, relieved by vomiting, and being contagious.

PERU, a large country of S. America, bounded on the N. by Popayan, on the W. by the Pacific Ocean, on the S. by Chili, and on the E. by the Andes. It is 1500 miles from N. to S. and 125 from E. to W. but in some places it is much broader. It never rains in the south parts; but in the north, where the mountains are not so high, it often rains excessively. There are large forests on the sides of the mountains which advance near the sea; but none of the trees are like those in Europe. Peru has been long celebrated for its mines of gold and silver, which are the chief or only source of its riches. Notwithstanding the little industry which is employed in working them, and the small help that commerce affords to the miners, 534,000 marks of silver, and 6,038 of gold, were smelted and refined in the royal mint at Lima, in 1790; and 5,162,239 piastres, in both materials, were coined there. Beside the produce of the mines, the commodities exported are sugar, Vienna wood, cotton, Peruvian bark, copper, and cocoa. The fiercest beasts of prey in Peru are the puma and jaquar, inaccurately called lions and tigers by the Europeans, but possessing neither the undaunted courage of the former, nor the ravenous cruelty of the latter: they are hardly formidable to man, and often turn their backs on the least appearance of resistance. A quadruped called the lama, peculiar to this country, was tamed to domestic purposes by the ancient Peruvians. In form it bears some resemblance to a deer, and some to a camel, and is of a size somewhat larger than a sheep. Its wool furnished the Peruvians with clothing, its flesh with food. It was even employed as a beast of burden, and carried a moderate load with much patience and docility; but it was never used for draught. Among the birds, the most remarkable is the condor, which is entitled to preeminence over the flying tribe, in bulk, strength, and courage. The river Guyaquil abounds with alligators, and the neighbouring country swarms almost as much with snakes and vipers as that round Porto Bello does with toads. When the Spaniards landed in this country, in 1530, they found it governed by sovereigns called Incas, who were revered by their subjects as divinities; and the inhabitants were found to be much more polished than

the natives of other parts of America, those of Mexico excepted. These were soon subdued by a few Spaniards, under the command of Francis Pizarro. Peru is inhabited by the Spaniards, the native Americans, and a mixture arising from both, called Mestics. The native Americans, who live among the forests, form, as it were, so many small republics, which are directed by a Spanish priest, and by their governor, assisted by the original natives, who serve as officers. They have no distrust, for they leave the doors of their huts always open, though they have cotton, calabashes, and a sort of aloes, of which they make thread, and several other small matters that they trade with, which might be easily stolen. They go naked, and paint their bodies with a red drug, called rocu. The same man is of all trades, for he builds his own hut, constructs his own canoe, and weaves his own cloth; but if a large house is to be built for common use, every one lends a helping hand. Their skin is of a red copper colour; and they have no beard nor hair on any part of their bodies except their heads, where it is black, long, and coarse. Those that are not much exposed to the weather are of a lighter colour than the rest. The natives who live at Quito seem to be of a different temper; for they are extremely idle, and so stupid, that they will sit whole days together upon their heels, without stirring or speaking. Their garment is a sort of a sack, with holes to put their arms through; and this is given them by their masters as part of their wages. The Mestics, though illegitimate, have all the privileges of a Spaniard, and are the persons who carry on all trades; for the Spaniards think it beneath them to meddle with any thing of this sort: they behave in a more tyrannical manner over the real Americans, than even the Spaniards themselves, insomuch that the governor is obliged to repress their insolence. Peru is now divided into three great audiences, which are Quito, Lima or Los Reyes, and Los Charcos; the whole under the government of a viceroy, whose authority once extended over all S. America, possessed by the Spaniards: but as some of the countries in this vast jurisdiction are above 2000 miles distant from the supreme seat of justice at Lima, the inhabitants were subject to the greatest inconveniences; to remedy which, two new viceroyalties have been established. The first is fixed at St. Fé de Bogota, the capital of the new kingdom of Granada, and extends over the whole of Terma Firma, and the audience of Quito. In the jurisdiction of the second, established in 1776, are the provinces of Plata, Buenos Ayres, Paraguay, Tucuman, Potosi, St. Cruz de la Sierra, and the towns of Mendoza and St. Juan. Lima is the capital. See A…s.

PERU (Balsam o…) See MYROXYLON.

To PERVA'DE. *v. a.* (*pervado*, Lat.) 1. To through an aperture; to permeate (*Black.*). To pass through the whole extension.

PERVA'SION. *s.* (from *pervade.*) The act …vading or passing through (*Boyle*).

PE'RVERSE. *a.* (*pervers*, Fr. *perversus*, Latin.) 1. Distorted from the right (*Milton*). 2. Obstinate in the wrong; stubborn; untractable (*Dryden*). 3. Petulant; vexatious; peevish; desirous to cross and vex; cross (*Shakspeare*).

PERVE'RSELY. *ad.* With intent to vex; peevishly; vexatiously; spitefully; crossly; with petty malignity (*Decay of Piety*)

PERVE'RSENESS. *s.* (from *perverse.*) 1. Petulance; peevishness; spiteful crossness (*Donne*). 2. Perversion; corruption: not in use (*Bacon*).

PERVE'RSION. *s.* (*perversion*, Fr.) The act of perverting; change to worse (*Swift*).

PERVE'RSITY. *s.* (*perversité*, Fr.) Perverseness; crossness (*Norris*).

To PERVE'RT. *v. a.* (*perverto*, Latin.) 1. To distort from the true end or purpose (*Milton*). 2. To corrupt; to turn from the right (*Milton*).

PERVE'RTER. *s.* (from *pervert.*) 1. One that changes any thing from good to bad; a corrupter (*South*). 2. One who distorts any thing from the right purpose (*Stillingfleet*).

PERVE'RTIBLE. *a.* (from *pervert.*) That may be easily perverted (*Ainsworth*).

PERUGIA, an ancient and populous city of Italy, capital of Perugino, with a strong citadel, a university, and a bishop's see. The churches, and many other buildings, public and private, are very handsome. It is seated on a hill, 75 miles N. of Rome. Lon. 12. 20 E. Lat. 43. 6 N.

PERUGIA, a lake of Italy, eight miles from the city of that name, in the province of Perugino. It is almost round, five miles in diameter, and in it are three islands.

PERUGINO, a province of Italy, in the Ecclesiastical State, bounded on the W. by Tuscany, on the S. by Orvietano, on the W. by the duchies of Spoleto and Urbino, and on the N. by the county of Citta Castellana. It is 25 miles in length, and near as much in breadth. The air is pure, and the soil fertile in corn and good wine. The capital is Perugia.

PERVICA'CIOUS. *a.* (*pervicax*, Latin.) Spitefully obstinate; peevishly contumacious (*Clarendon*).

PERVICA'CIOUSLY. *ad.* (from *pervicacious.*) With spiteful obstinacy.

PERVICA'CIOUSNESS. PERVICA'CITY. PERVICA'CY. *s.* (*pervicacia*, Latin; from *pervicacious.*) Spiteful obstinacy.

PE'RVIOUS. *a.* (*pervius*, Latin.) 1. Admitting passage; capable of being permeated (*Taylor*). 2. Pervading; permeating: not proper (*Prior*).

PE'RVIOUSNESS. *s.* (from *pervious.*) Quality of admitting a passage (*Boyle*).

PE'RUKE. *s.* (*peruque*, French.) A cap of false hair; a periwig (*Wiseman*).

To PE'RUKE. *v. a.* (from the noun.) To dress in adscititious hair.

PE'RUKEMAKER. *s.* (*peruke* and *maker.*) A maker of perukes; a wigmaker.

PERULA, in botany, a genus of the class dioecia, order polyandria. Calyx two-leaved, corol one-petalled. Male: germs four, barren, on short pedicels. Female: styles one to each germ; capsule pedicelled, drooping, three-celled, three-valved; seeds solitary. One species only. A New Grenada shrub.

PERU'SAL. *s.* (from *peruse.*) The act of reading (*Atterbury*).

To PERU'SE. *v. a.* (*per* and *use.*) 1. To read (*Bacon*). 2. To observe; to examine (*Shakspeare*).

PERU'SER. *s.* (from *peruse.*) A reader; examiner (*Woodward*).

PERUVIAN MASTIC TREE. See SCHINUS.

PERUVIAN BARK. See CINCHONA.

PERUVIANUS CORTEX. Peruvian bark. See CINCHONA.

PERUVIANUS CORTEX FLAVUS. See CINCHONA.

PERUVIANUS CORTEX RUBER. See CINCHONA.

PES ALEXANDRINUS. See PYRETHRUM.

PES CATI. See GNAPHALIUM.

PES COLUMBINUS. See GERANIUM COLUMBINUM.

PES LEONIS. The ladies mantle is sometimes so called. See ALCHEMILLA.

PESARO, a fortified seaport of Italy, in the duchy of Urbino, and a bishop's see. The cathedral is magnificent, and it has handsome churches, convents, and palaces, with exquisite paintings. The environs are remarkable for producing olives, and excellent figs. It is seated on an eminence, at the mouth of the Foglia, on the gulf of Venice, 17 miles E.N.E. of Urbino. Lon. 13. 2 E. Lat. 43. 52 N.

PESCARA, a strong town of Naples, in Abruzzo Citeriore. It was taken by the French in 1798, and stands at the mouth of a river of the same name, on the gulf of Venice, 10 miles N.N.E. of Civita di Chieti.

PESCHIERA, a strong town of Italy, in the Veronese. It was taken by the French in 1796; and the garrison surrendered to the Austrians in 1799. It is seated on the river Mincio, where it proceeds from the lake Garda, 16 miles W. of Verona.

PESCIA, a town of Tuscany, celebrated for its fine oil, 27 miles W. by N. of Florence.

PESSARY. (from πεσσω, to soften.) An instrument that is introduced into the vagina to support the uterus.

PEST, a town of Hungary, capital of a county of the same name, with a fortress, a royal palace, and a university, the only one in the kingdom. Here are many Greek merchants, who conduct the Levant trade to Germany and the northern nations. It is seated on the E. side of the Danube, opposite Buda, 96 miles E.S.E. of Presburg. Lon. 19. 8 E. Lat. 47. 30 N.

PEST. *s.* (*peste*, Fr. *pestis*, Lat.) 1. Plague; pestilence (*Pope*). 2. Any thing mischievous or destructive (*Milton*).

To PE'STER. *v. a.* (*pester*, Fr.) 1. To disturb; to perplex; to harass; to turmoil (*Swift*). 2. To encumber (*Milton*).

PE'STERER. *s.* (from *pester.*) One that pesters or disturbs.

PE'STEROUS. *a.* (from *pester.*) Encumbering; cumbersome (*Bacon*).

PE'STHOUSE. *s.* (from *pest* and *house.*) A hospital for persons infected with the plague.

PESTI'FEROUS. *a.* (from *pestifer*, Latin.) 1. Destructive; mischievous (*Shakspeare*). 2. Pestilential; malignant; infectious (*Arb.*).

PE'STILENCE. *s.* (*pestilence*, Fr. *pestilentia*, Lat.) Plague; pest; contagious distemper (*Shakspeare*).

PE'STILENT. *a.* (*pestilent*, Fr. *pestilens*, Latin.) 1. Producing plagues; malignant (*Bentley*). 2. Mischievous; destructive (*Knolles*).

PESTILE'NTIAL. *a.* (*pestilentiel*, Fr.) 1. Partaking of the nature of pestilence; producing pestilence; infectious; contagious (*Woodward*). 2. Mischievous; destructive; pernicious (*South*).

PE'STILENTLY. *ad.* (from *pestilent.*) Mischievously; destructively.

PESTILLA'TION. *s.* (*pistillum*, Lat.) The act of breaking in a mortar (*Brown*).

PESTIS. The plague. A genus of disease in the class pyrexia and order exanthemata of Cullen, characterized by typhus, which is contagious in the extreme, prostration of strength, buboes, and carbuncles, petechiæ, hæmorrhage, and colliquative diarrhœa.

PE'STLE. *s.* (*pistillum*, Lat.) An instrument with which any thing is broken in a mortar (*Locke*).

PESTLE OF PORK. *s.* A gammon of bacon.

PET. *s.* (perhaps from *petit*, little.) 1. A slight passion; a slight fit of peevishness (*L'Estrange*). 2. A lamb taken into the house and brought up by hand. See PEAT. (*Hanmer*).

PETAGUEL, a province on the N. coast of Brasil, between the provinces of Seara and Rio Grande. It contains mines of silver.

PETAL, in botany. (πεταλον, from πεταω, to expand.) The Greek word signifies a leaf; but it has been appropriated by Columna, and from him by other modern authors, the flower-leaf. Tegmen floris corollaceum, Philos. Bot. The corollaceous integument of the flower. In flowers of one petal, the corol and petal are the same. In flowers of several petals, the corol is the whole, and the petals are the parts. Or, to speak more accurately, in a monopetalous flower, the petal is the corol, exclusive of the nectary: in a polypetalous flower, it is one of the leaves of which the whole corol is composed.

In the former it consists of the tube and limb. In the latter of the claw and lamina.

PETALIFORM STIGMA. In botany, a petal-shaped stigma: as in iris.

PETALINUM NECTARIUM. A petaline nectary.

PETALOMA, in botany, a genus of the

class decandria, order monogynia. Calyx cup-shaped, five-toothed; petals five, inserted into the calyx; stamens seated on the margin of the calyx; berry one-celled. Two species; tall trees of Guiana and the West Indies.

PETALOUS FLOWER, in botany, a petalled flower, or a flower having petals; in opposition to apetalous, destitute of petals, or having no corol.

PETARD, in war, a kind of engine of metal, somewhat in shape of a high-crowned hat, or truncated cone; serving to break down gates, barricades, draw-bridges, or the like works which are intended to be surprised.

The petard may be considered as a piece of ordnance, very short, narrow at the breech, and wide at the muzzle; made of copper mixed with a little brass; or of lead with tin; usually about 8.5 inches within at the bottom; the diameter at the beginning of the round part is six, and distant from the lower base nine inches: the circular part is described from the point where the perpendicular to the sides meets the middle line or axis; the thickness of metal is 1.0 inches: there is a brim at the bottom that projects the metal by two inches, and is one inch thick, in which are six holes of half an inch diameter, which serve for screws to fasten the petard on a board in a firm manner; there is a cavity within at the bottom, half an inch deep, and as much in height to fix a board, in order to keep the charge in the petard before it is fixed to the board or plank. There are likewise two handles of about three inches from the flat ring, five inches long, $\frac{7}{10}$ thick, and 1.8 from the outside to the metal. Lastly, a hole of an inch diameter is made either at the top, or on the side, to screw in an iron fuse by which the powder is fired, which fuse is filled with a slow composition, in order that when it is lighted, the petardier may have time to retire out of danger. See the section of a petard in fig. 9. pl. 133.

PETASITES. (πετασιτης; from πετασος, a hat, so named because its leaves are shaped like a hat) Butterbur. Pestilentwort. Tussilago petasites of Linnéus. The roots of this plant are recommended as aperient and alexipharmic, and promise, though now forgotten, to be of considerable activity. They have a strong smell, and a bitterish acrid taste, of the aromatic kind, but not agreeable.

PETAVIUS (Dionysius), or DENIS PETAU, a French jesuit, born at Orleans, 1583. He was at the age of 19 made professor of philosophy at Bourges, and was admitted among the jesuits in 1605. He defended the catholic religion against the protestants, and his criticisms were particularly directed against Scaliger, and even against his friend Casaubon. He died aft[illegible]t in the service of literature, 1[illegible] He was, according to Gassendus, the most consummate scholar the jesuits ever had. As a chronologist he was particularly eminent, and his Latin is elegant and refined. He wrote De doctrinâ temporum, 2 vols. fol.—uranologia, 3 vols.—Rationarium temporum, fol. and Leyden, 2 vols. 8vo. a valuable work abridged by Le Clerc.—Dogmata theologica, 5 vols. fol.—the Psalms translated into Greek verse, 12mo.—De ecclesiâ hierarchiâ, folio, besides controversial pamphlets.

PE-TCHE-LI, the principal province of China, bounded on the N. by the great wall and part of Tartary, E. by the Yellow sea, S. by Chang-tong and Honan, and W. by the mountains of Chan-si. It contains nine cities of the first class, which have many others under their jurisdiction. Although Pe-tche-li extends no further than the 42d degree N. yet all its rivers are so much frozen during four months in the year, that waggons with the heaviest loads may safely pass them. The soil is sandy, and produces very little rice; but it abounds with all other kind of grain, and with the greater part of the fruit trees common in Europe. But what renders this province the most considerable is, that the riches of the whole empire are brought hither, the southern provinces furnishing it with every thing they produce, that is most uncommon and delicious. The inhabitants, in general, are reckoned not so polite, nor so apt to learn the sciences, as those of the southern provinces; but they are stronger and more warlike, in which they resemble the people who inhabit the northern provinces. Peking is the capital.

PETCHSTEIN, in mineralogy. See PITCHSTONE.

PETECHIÆ. (from the Italian *petecchio*, a fleabite, because they resemble the bites of fleas.) Red or purple spots that mostly appear in contagious diseases.

PETER (St.), the apostle, born at Bethsaida, was son of John, Jona, or Joanna, and brother of St. Andrew (John i. 42, 43.). His first name was Simon or Simeon; but when our Saviour called him to the apostleship, he changed his name into Cephas, that is, in Syriac, a stone or a rock; in Latin, *petra*, whence Peter. He was a married man; and had his house, his mother-in-law, and his wife, at Capernaum, upon the lake of Gennesareth (Mark i. 29. Mat. viii. 14. Luke iv. 38.). St. Andrew, having been first called by Jesus Christ, met his brother Simon, and told him, (John i. 41.) We have found the Messiah, and then brought him to Jesus. Jesus beholding him, said to him, Thou art Simon, son of Jonah; henceforth thou shalt be called Cephas, that is, stone or rock. After having passed one day with our Saviour, they returned to their ordinary occupation, which was fishing. Yet it is thought they were present with him at the marriage of Cana in Galilee. This happened in the 30th year of the vulgar Christian era.

The acts which distinguish the apostleship of St. Peter are fully detailed in the sacred scriptures; for which reason we forbear to introduce them in this place.

St. Peter was the author of two epistles, received into the canon of the New Testament. Of these the former was written from a city which the apostle called Babylon; whether he meant the remains of the former city of Baby-

lon, or adumbrated Jerusalem under that name, is uncertain: Michaelis inclines to the latter opinion. The date of this first epistle is generally assigned between the years 63 and 65. The second epistle, written soon after the former, and (ch. i. 14.) when the apostle was old and near his end, is usually dated in 65. The apostle suffered martyrdom not long after this epistle was written, that is, at latest, about A. D. 68.

St. Peter's style, says a modern author, expresses the noble vehemence and fervour of his spirit, the full knowledge he had of Christianity, and the strong assurance he had of the truth and certainty of his doctrine; and he writes with the authority of the first man in the college of the apostles. He writes with that quickness and rapidity of style, with that noble neglect of some of the formal consequences and niceties of grammar, still preserving its true reason, and natural analogy (which are always marks of a sublime genius), that you can scarce perceive the pauses of his discourse and distinction of his periods. The great Joseph Scaliger calls St. Peter's first epistle majestic; and we hope he was more judicious than to exclude the second, though he did not name it.

A noble majesty, and becoming freedom, is what distinguishes St. Peter; a devout and judicious person cannot read him without solemn attention and awful concern. The conflagration of this lower world, and future judgment of angels and men, in the third chapter of the second, is described in such strong and terrible terms, such awful circumstances, that in the description we see the planetary heavens and this our earth wrapped up with devouring flames, hear the groans of an expiring world, and the crushes of nature tumbling into universal ruin.

The authority of the second epistle of St. Peter was for some time doubted of, as Origen, Eusebius, St. Jerome, and others, have observed. What made the ancients call it in question, is the difference of its style from the first. The third chapter, which describes the catastrophe of the visible world, made Grotius think this epistle was wrote after the taking of Jerusalem; because that was not to happen till after the destruction of that city; upon which he conjectures, that Simeon, bishop of Jerusalem, is the author of this epistle, and that the inscription which carries St. Peter's name is corrupted. But the best critics admit this epistle to be the genuine work of St. Peter, who discovers himself where he says, that he was present at our Lord's transfiguration; and where he tells the Jews, this was the second letter he had written to them. The reader may see this question fully discussed, and the authority of this epistle established beyond all doubt, by the learned Dr. Sherlock, in his Dissertation on the authority of the Second Epistle of St. Peter.

St. Peter has been made the author of several books, such were his Acts, his Gospel, his Revelation, his work about preaching, and another about judgment. There is extant a large history of St. Peter, called the Recognitions, ascribed to St. Clement.

Peter Alexiowitz I. surnamed the Great, succeeded to the throne of Muscovy, on the death of his brother Theodore, to the exclusion of his elder brother Iwan, whose intellects were too feeble to support the fatigues of government. This gave offence to Sophia, his half sister, who roused into rebellion the Strelitzes, a formidable body of militia; but Peter, too wise to foment a civil war, consented to share the throne with his brother Iwan. Without education, yet with the strongest powers of nature, Peter felt that much was still to be acquired before he could realize the vast projects of his mind. To counteract the Strelitzes, who were devoted to the intriguing Sophia, and more inclined to dispute than to obey his commands, he became the favourite of the army, and enlisting as a private soldier in a company dressed and disciplined in the German manner, he gradually rose to command by his services, and by sharing the toils and privations of a military life. By the death of his brother in 1696, he became sole emperor, and then conquered Azoph from the Turks. Feeling his inferiority as a naval power, he sent, in 1698, an embassy to Holland, and went in a disguised character in the ambassador's suite; and that he might personally be acquainted with the process of ship-building, he enrolled himself at Amsterdam among the ship carpenters, and worked under the name of master Peter. The next year he passed over to England, where he acquired the complete knowledge of ship-building, and after receiving every mark of respect from William III. he left this country, accompanied by several English ship-builders, and artificers. From England he went to Vienna; but the intelligence that Sophia had roused the Strelitzes to rebellion hastened his return to Moscow. The ringleaders were punished; but the princess, who was the most guilty, was only confined in a monastery. Improved by the view of foreign countries, and the knowledge of their commercial resources, Peter now displayed to the world the enlightened plans of his capacious mind. He liberally invited the most learned among distant nations to seek an honourable residence in Russia, and to instruct his uncivilized subjects in the various arts of life. Russia was therefore visited by sailors, artists, mechanics, mathematicians, and adventurers of every degree and profession; and though his subjects viewed these new settlers with jealousy, Peter soon mingled and united them by the strong ties of mutual dependence and social union. In 1700 he declared war against Charles XII. of Sweden, and though defeated by his enemy, he persevered with undaunted courage, observing, "though I know I must be overcome for a great while, my armies will at last be taught to conquer." In the midst of his disasters in Poland, he formed the project of erecting a new metropolis on the Baltic sea, and after he had added to his dominions the best part of Livonia and Ingria, he,

in 1703, laid the foundations of Petersburg. At last the battle of Pultowa, in 1709, crowned his earnest wishes, and he saw the long victorious Swedes conquered, and their heroic leader Charles obliged to fly. Peter used this victory like a wise man; the Swedish prisoners were induced to settle among their conquerors, and not less than 3000 officers were prevailed upon to fix their residence and spread civilization, improvement, and the arts of polished life, in various parts of his extensive empire. In consequence of the victory of Pultowa, Peter secured the possession of Livonia and Ingria, to which he added part of Pomerania and Finland; but the intrigues of Charles XII. at the Turkish court at last prevailed upon the Ottomans to break the truce, and in 1712 Peter was suddenly surrounded on the banks of the Pruth, and his army devoted to destruction. While he considered every thing as lost, his wife Catherine, offering a large bribe to the grand vizier, saved her husband's honour and his army, and in consequence of this the grateful czar established the order of St. Catherine, into which only women are admitted. After the treaty of peace with Charles XII. Peter visited again foreign countries. In 1716 he was in Denmark, and after visiting the schools, public places, and curiosities, he passed to Hamburgh, Hanover, Wolfenbuttle, and Holland, and the next year proceeded to Paris. In the capital of France he was received with great ceremony; but despising the pomp and pageantry of greatness, he preferred the conversation of the learned, and returned home better pleased with the information which he had received, than with the unmeaning marks of homage paid to his imperial rank. When at Paris he visited the tomb of Richelieu, exclaiming, "great minister, would it might have happened you had lived in my age, I would have granted you half of my dominions to learn from you how to govern the rest." Returned to Russia, Peter laboured to reform and improve the character of his country. After breaking gradually to pieces the dangerous establishment of the Strelitzes, he appointed a regular body of 100,000 troops; he built a navy of 40 ships of the line; he established colleges and schools of medicine, botany, belles lettres, &c. in the chief cities of his dominions, and by purchasing pictures of celebrity from Italy, he introduced a taste for painting and the fine arts among his subjects; and made the largest possible collections of books and manuscripts in various languages, wisely distributed where they could prove most useful. Religion, pure and uncorrupt, was made, as far as his zealous endeavours could, to supersede superstition and ignorance; the patriarchate, once formidable even to the sovereign, was abolished, and the people were instructed in their own, and not in a foreign language. The laws were rendered more simple, decisions were to be announced before the expiration of 11 days; and in short every measure which could tend to meliorate the situation of the people, to increase their knowledge, and to contribute to their comfort, was, with the most liberal policy, adopted and enforced. This truly great and worthy prince died of a strangury, caused by an imposthume in the neck of his bladder, 28th Jan. 1725, in his 53d year. Peter had a son, Alexis, who lived to the age of manhood; but engaged in a conspiracy in 1717, against his father, and was condemned to die; and though the sentence was suspended, he died some short time after, not without suspicion of being cut off privately by the czar, as several of his accomplices suffered the severest punishment of the law. At his death, Peter appointed for his successor his widow Catherine, whom, from a soldier's wife, he had raised, in consequence of her heroic character, to share his bed and his throne. Peter wrote several pieces on naval affairs. (*Lempriere*.)

PETER II. emperor of Russia, son of Alexis Petrowitz, succeeded the empress Catherine, at the age of 13, in 1727. The prominent feature of his reign is the banishment into Siberia of the great favourite Menzikoff. The emperor died of the small-pox, 1730, aged 15.

PETER III. emperor of Russia, son of Anne, the eldest daughter of Peter the Great, was born 1728, and ascended the throne after the empress Elizabeth, 1761. The beginning of his reign was auspicious; he admired the character of the heroic king of Prussia, but unfortunately wanted the vigour and decision which marked that great man. His attempts therefore to reform his people proved abortive, and rendered him contemptible; so that his wife Catherine, taking advantage of his timidity, dethroned him, 6th July, 1762, and assumed the reins of government under the name of Catherine II. Peter died seven days after; but though his death is attributed to an hemorrhoidal flux, it is too evident that violence terminated his existence.

PETER, of Cluni, or the Venerable, was born in Auvergne, and was made, in 1121, general of the order of Cluni. He received at his abbey pope Innocent II. in 1130, and afterwards granted a kind asylum to the unfortunate Abelard. He died 1156, aged 65. He wrote treatises on the divinity of Christ—against the Jews—on infant baptism—the authority of the church, &c.

PETER, an ecclesiastic of Blois, preceptor and secretary to William II. king of Sicily. He was invited by Henry II. to England, where he obtained the archdeaconry of Bath, and afterwards that of London. He died in England, 1200. Of his writings, 183 letters, 65 sermons, &c. have been preserved.

PETER, the Hermit, a gentleman of Amiens, who quitted the military profession to become a pilgrim. Under the expectation of the immediate dissolution of the world, he, with many other deluded men, hastened to the Holy Land, in 1093, that he might terminate his days in a spot where the Saviour was born. On his return, he spoke in so affecting a manner of the cruel treatment which the Christ-

ians experienced in Palestine, that Urban II. sent him over Europe to preach a general crusade to deliver the Holy Land from the infidels. The eloquence of Peter, and the spirit of the times, prevailed; a numerous concourse of people flocked together, and the holy hermit began his march at the head of above 40,000 men. In crossing Hungary, this religious army committed the most horrid excesses, and so provoked the inhabitants, that in skirmishes with them and with the Turks, many lost their lives, and only 3000 reached the gates of Constantinople. In advancing through Asia, the siege of Antioch delayed their progress, and Peter would have abandoned the enterprise, had he not been bound by an oath by Tancred to share the dangers of the crusade. At the conquest of the Holy Land, and in the siege of Jerusalem, 1099, Peter behaved with valour, and for his services was appointed vicar-general of Palestine. He afterwards returned to Europe, and died at the abbey of New-Montier, which he had founded. (*Lempriere.*)

Peter the wild boy, a youth found in a savage state in the woods in Hanover, 1726, where he had lived for some time on berries and roots. He was about 12 years old, but it is unknown how long he had been in that wild state; though from the remains of a shirt collar found about his neck, it is probable he had not been many years exposed. He came to England in 1727, and was placed at a farmhouse at Northchurch, Hants; but no instruction could ever make him articulate words; and he died in 1735, a melancholy instance of savage idiotism. The English government allowed a pension of 35l. a year for his support.

Peter and Paul (St.), or Petropauloskoi, a seaport of Russia, in Kamschatka. The town consists of some log-houses, and a few conical huts. Captain Clarke, who succeeded captain Cook, and died at sea, was interred here. It is seated on the E. side of Awatska bay. Lon. 158. 48 E. Lat. 53. 1 N.

Peter-pence was an annual tribute of one penny, paid at Rome out of every family, at the feast of St. Peter. And this Ina. the Saxon king, when he went in pilgrimage to Rome, about the year 740, gave to the pope partly as alms, and partly in recompense of a house erected in Rome for English pilgrims. And this continued to be paid generally until the time of king Henry VIII. when it was enacted, that from henceforth no person shall pay any pensions, Peter-pence, or other impositions, to the use of the bishop or see of Rome.

PETERBOROUGH, a city of Northamptonshire, 81 miles from London. It is the least city except perhaps Ely, and unquestionably the poorest bishopric, though one of the oldest towns in England. It had a monastery dedicated to St. Peter, and founded as early as the year 656, to which the abbot of Croyland and his monks flying for protection in the year 870, they were overtaken and murdered in a court of this monastery, called the monks church-yard, because they were all buried here; and to this day is to be seen the tombstone, with their effigies, which had been erected over their common grave. Soon after this the Danes destroyed both the monastery and friars, so that it lay destitute for above 100 years. The monks were, however, restored, and lived very sumptuously, with a mitred abbot at their head, till the Reformation, when Henry VIII. converted it into a bishop's see. The cathedral, which is said to be more than 1000 years old, though apparently more modern, is a most noble Gothic fabric, and was much more so before it was defaced in the civil wars. The west front, which is 150 feet broad, is very stately, and, besides columns curiously adorned, is supported by three of the tallest arches in Britain. The windows of the cloisters are finely stained with scripture history and the succession of it abbots. There are in the church, monuments of queen Catherine, wife of Henry VIII. and of Mary queen of Scots; and the figure of one Scarlet, or Scailett, the sexton, who buried them, and lived to 95, after he had buried all the housekeepers of the town twice over. There is but one parish church besides the cathedral. The city is governed like a borough, by a charter of Henry VIII. though without either mayor or aldermen; and sends two members to parliament, every pot-walloper in the town having the liberty of voting. All the officers of the city are elected by the dean and chapter, consisting of six prebendaries, who are all lords of the manor. Besides the dean and chapter, who are an ecclesiastical corporation distinct from the bishop, there are eight petty canons, four students in divinity, one epistler, one gospeller, a subdean, subtreasurer, and chanter, eight choristers, eight singing men, two chancellors, besides a steward, organist, &c. a grammar school, and two charity-schools. The river Nen, over which there is here a wooden bridge, is navigable by barges to Northampton, 50 miles further, which bring coal, corn, &c. and by which they export, in some years, 6000 quarters of malt, besides other goods, especially the woollen manufactures either of cloth or stockings, in which the poor are employed. The air of Peterborough is said not to be very wholesome, by reason of the neighbouring fens; but the water of the river is fresh and good, the highest spring-tide scarcely ever coming up within five miles of the town; and there is plenty of excellent water in their wells. The streets are some of them very narrow, though they have been recently much improved by new paving, under an act of parliament. There is a handsome market-house, over which are kept the assizes and sessions. Its jurisdiction extends over 32 towns and hamlets, wherein the civil magistrates appointed by the royal commission are vested with the same power as judges of assize, and hold their quarterly sessions in this city. Lon. 0. 4 W. Lat. 52. 30 N.

PETERHEAD, a seaport of Scotland, in

Aberdeenshire, situate on a peninsula, about a mile S. of the mouth of the Ugie. It has two harbours, defended by piers; a considerable trade in the fishery, and to the Baltic; and manufactures of thread, woollen cloth, and cotton. Here is a small fort and a battery. A mineral spring, of a powerful diuretic quality, and the sea-bathing, bring a great resort of company, for whose accommodation there is a ball-room, and many elegant houses. It stands a little to the W. of Buchanness, the most eastern promontory of Scotland, 34 miles N.E. of Aberdeen. Lon. 1. 35 W. Lat. 57. 27 N.

PETERSBURG, a town of Pennsylvania, in York county, 25 miles S.W. of York, and 58 N. of Washington.

PETERSBURG, a town of Virginia, in Dinwiddie county. It has a considerable trade, particularly in tobacco and flour, and is seated on the S. side of the Appamatox, 25 miles S. of Richmond.

PETERSBURG, a town of the state of Georgia, in Albert county, situate at the confluence of Broad with Savannah river, 40 miles N.W. of Augusta.

PETERSBURG, or ST. PETERBURG, the metropolis of the empire of Russia, in a government of the same name, with a university. It is seated on the Neva, near the gulf of Finland, and built partly on some islands formed by the river, and partly upon the continent. The ground on which Petersburg now stands was a vast morass, occupied by a few fishermen's huts. Peter the Great first began this city by the erection of a citadel with six bastions, in 1703; he built also a small hut for himself, and some wooden hovels. In 1710, count Golovkin built the first house of brick; and the next year the emperor, with his own hands, laid the foundation of a house of the same materials. From these small beginnings rose the imperial city of Petersburg; and in less than nine years after the wooden hovels were erected, the seat of empire was transferred to it from Moscow. The streets are straight, and generally broad and long, frequently intersecting each other in abrupt and sharp corners; and three of the principal ones, which meet in a point at the admiralty, are above two miles n length: most of them are paved, but a few till remain floored with planks; and numerous canals, from one part of the river to another, pass through many of them, by which the inhabitants are supplied with water. In several parts, wooden houses, scarcely superior to common cottages, are blended with the public buildings; but as they are not suffered to be repaired, or if burnt down, to be rebuilt, the number of them is now reduced one half; however, the mother of all that exists in the city, the first wooden cottage of Peter the Great, has a brick building on arches erected over it, to preserve it as a sacred relic of that monarch. The brick houses are covered with stucco, painted of a pink, yellow, or green colour; the roofs of them are nearly flat, formed of sheet or cast iron, or sheet copper, and commonly painted green or red: tiles are only used for outhouses and the meaner sort of buildings. The mansions of the nobility are vast piles of building, furnished in the most elegant style. Petersburg, though more compact than the other Russian cities, bears a resemblance to the towns of this country, and is built in a very straggling manner. On the S. and S.E. it has a boundary formed by the town ditch, which is dug far beyond the built parts; and on the N.E. and N. flows the most northern branch of the Neva, called the Nevka, which includes a still more ample interstice. The circumference by these and the sea is nearly 20 miles; but the part properly built upon occupies little more than one-fourth of this space. The inhabitants are computed to be 230,000. The main stream of the Neva is, in many places, as broad as the Thames at London, and its banks are lined on each side with a continued range of handsome buildings. On the N. side are the grand ducal palace, the fortress, the custom-house, the academy of sciences, and the academy of arts. On the S. side are the imperial palace, the marble palace, the admiralty, the arsenal, the bank, the mansions of many Russian nobles, and the English-line, so called, because the whole row is almost wholly occupied by English merchants. In the front of these buildings is the quay, which extends three miles, except where it is interrupted by the admiralty; and the Neva, during the whole of that space, is embanked by a wall, parapet, and pavement of hewn granite. The opposite divisions of Petersburg, situate on each side of the Neva, are connected by two bridges, on pontoons; and there are several others over the different arms of the river. These bridges, on account of the large masses of ice driven down the stream from the lake Ladoga, are usually removed when they first make their appearance; and for a few days, till the river is frozen hard enough to bear carriages, there is no communication between the opposite parts of the town. Among the noblest ornaments of Petersburg, is an equestrian statue of Peter the Great, in bronze, of a colossal size; the pedestal of which is a huge rock, brought to the spot at a great expence. Within the walls of the fortress is the cathedral of St. Peter and St. Paul, in which are deposited the remains of Peter the Great, and of the successive sovereigns, except Peter II. buried at Moscow. Petersburg has a considerable trade in exporting the products of the empire, and has a communication by canals and rivers with many of the southern provinces as far as Astrachan, on the borders of the Caspian sea It is 425 miles N.W. of Moscow, 500 E. by N. of Stockholm, and 1000 N.N.E. of Vienna. Lon. 30. 19 E. Lat. 59. 56 N.

PETERSFIELD, is a handsome town of Hampshire, in England, and sends two members to parliament. It is seated in lon. 1. 5 W. Lat. 51. 5 N.

PETERWARADIN, a fortified town in Sclavonia, and one of the strongest frontier places the house of Austria has against the

Turks, seated on the Danube, between the Drave and the Save. Lon. 20. 0 E. Lat. 45. 20 N.

PETER WORT, in botany. See ASCYRUM.

PETESIA, in botany, a genus of the class tetrandria, order monogynia. Corol one-petalled, funnel-form; stigma bifid; berry many-seeded. Shrubs of West Indies and Polynesia.

PETHERTON, a town in Somersetshire, with a market on Tuesday; seated on the Parret, 18 miles S. by W. of Wells, and 133 W. by S. of London. Lon. 2. 41 E. Lat. 50. 56 N.

PETILIA, a town of Magna Græcia, the capital of Lucania, built by Philoctetes, who after his return from the Trojan war left his country Meliboea, because his subjects had revolted.

PETILII, two tribunes who accused Scipio Africanus of extortion. He was acquitted.

PETILIUS. The most remarkable of this name is a governor of the capitol, who stole the treasures intrusted to his care. He was accused, but though guilty, he was acquitted, as being the friend of Augustus.

PETIOLAR CIRRUS. A petiolar tendril. Proceeding from the petiole of a leaf. A petiolar peduncle. Inserted into a petiole. A petiolar bud. Formed from a petiole. A petiolar gland. Growing on the petiole: as in ricinus, iatropha, passiflora, cassia, mimosa; &c.

PETIOLATE LEAF. A petioled leaf. Growing on a petiole or footstalk, inserted into it usually at the base. Opposed to sessile.

PETIOLE. In botany, a leaf-stalk or footstalk. Trunci species, adnectens folium, nec fructificationem. Philos. Bot. Fulcrum sustinens folium. Delin. Pl. Ramus foliiferus, folio proprius. Regn. Veg. A partial stem, supporting the leaf, or connecting it with the stem or branch. It sometimes happens, but very rarely, that the same foot-stalk supports both leaf and fructification, as in turnera and hibiscus.

PETIOLULE. A partial petiole. Connecting a leaflet with the main petiole, in compound leaves.

PETIT (Peter), a considerable mathematician and philosopher of France, was born at Montluçon, in the diocese of Bourges, in the year 1589, according to some, but in 1600 according to others. He first cultivated the mathematics and philosophy in the place of his nativity; but in 1633 he repaired to Paris, to which place his reputation had procured him an invitation. Here he became highly celebrated for his ingenious writings, and for his connections with Pascal, Des Cartes, Mersenne, and the other great men of that time. He was employed on several occasions by cardinal Richelieu; he was commissioned by this minister to visit the seaports, with the title of the king's engineer; and was also sent into Italy upon the king's business. He was at Tours in 1640, where he married; and was afterwards made intendant of the fortifications. Baillet, in his Life of Des Cartes, says that Petit had a great genius for mathematics; that he excelled particularly in astronomy; and had a singular passion for experimental philosophy. He was intimately connected with Pascal, with whom he made, at Rouen, the same experiments concerning the vacuum, which Torricelli had before made in Italy; and was assured of their truth by frequent repetitions. He died August the 20th, 1667, at Lagny, near Paris, whither he had retired for some time before his decease. He published several works upon physical and astronomical subjects, as well as on chronology and theology.

PETIT, or PETITE, a French word signifying little or small.

PETITE GUERRE denotes the operations of detached parties and the war of posts. See WAR.

PETIT SERGEANTY. See SERGEANTY.

PETIT TREASON. See TREASON.

PETIT GUAVE, a seaport of St. Domingo, seated on a bay at the west end of the island. It is 200 miles E. of Jamaica. Lon. 72. 52 W. Lat. 18. 27 N.

PETITIA, in botany, a genus of the class tetrandria, order monogynia. Calyx four-toothed, inferior; corol four-parted; drupe with a two-celled nut. One species, a shrub of St. Domingo, with flowers in axillary panicles.

PETITIO PRINCIPII, in logic, the taking a thing for true, and drawing conclusions from it as such, when it is really false; or at least wants to be proved before any inferences can be drawn from it.

PETITION, a supplication made by an inferior to a superior, and especially to one having jurisdiction. It is used for that remedy which the subject hath to help a wrong done by the king, who hath a prerogative not to be sued by writ: in which sense it is either general, that the king do him right; whereupon follows a general indorsement upon the same, Let right be done the party: or it is special, when the conclusion and indorsement are special, for this or that to be done, &c.

By statute, the soliciting, labouring, or procuring the putting the hands or consent of above twenty persons to any petition to the king, or either house of parliament, for alterations in church or state, unless by assent of three or more justices of the peace of the county, or a majority of the grand jury at the assizes or sessions, &c. and repairing to the king or parliament to deliver such petition with above the number of ten persons, is subject to a fine of 100l. and three months imprisonment, being proved by two witnesses within six months, in the court of B. R. or at the assizes, &c. And if what is required by this statute be observed, care must be taken that petitions to the king contain nothing which may be interpreted to reflect on the administration; for if they do, it may come under the denomination of a libel: and it is remarkable, that the petition of the city of London for the

sitting of a parliament was deemed libellous, because it suggested that the king's dissolving a late parliament was an obstruction of justice; also the petition of the seven bishops sent to the Tower by James II. was called a libel, &c. To subscribe a petition to the king, to frighten him into a change of his measures, intimating, that if it be denied, many thousands of his subjects will be discontented, &c. is included among the contempts against the king's person and government, tending to weaken the same, and is punishable by fine and imprisonment.

PETI'TION. *s.* (*petitio*, Lat.) 1. Request; intreaty; supplication (*Shakspeare*). 2. Single branch or article of a prayer (*Dryden*).

To PETI'TION. *v. a.* (from the noun.) To solicit; to supplicate (*Addison*).

PETITIONARILY. *ad.* (from *petitionary.*) By way of begging the question (*Brown*).

PETITIONARY. *a.* (from *petition.*) 1. Supplicatory; coming with petitions (*Shaks.*). 2. Containing petitions or requests (*Hooker*).

PETITIONER. *s.* (from *petition.*) One who offers a petition (*South*).

PETITORY. *a.* (*petitorius*, Lat. *petitoire*, Fr.) Petitioning; claiming the property of any thing (*Ainsworth*).

PETITOT (John), a curious painter in enamel, born at Geneva, in 1607. He associated his labours with Bordier, his brother-in-law, jointly with whom he painted the portraits of Charles I. and the whole royal family. He died in 1691.

PETIVER (James), a skilful English botanist, contemporary with Plukenet, was apothecary to the charter-house, and died in 1718. Sir Hans Sloane purchased his collection of plants after his death, and with many other learned men attended his funeral, out of respect for his talents.

PETIVERIA. Guinea hen-weed. In botany, a genus of the class heptandria, order monogynia. Calyx four-leaved; corolless; style lateral; stigma pencil-form; seed one with four reflected awns at top. Two species; herbs of Jamaica.

PETOLA, in botany See MOMORDICA.

PETOUNE, a city of Eastern Chinese Tartary, in the department of Kirin. It has scarcely any inhabitants but Tartar soldiers, and Chinese condemned to exile. It is seated on the Songari, 112 miles N. by E. of Kirin, and 500 N.E. of Pekin. Lon. 124. 55 E. Lat. 45. 3 N.

PETRA, the capital town of Arabia Petræa. *Strab.*—This name was common also to four towns in Europe.

PETRÆA, one of the Oceanides.—A part of Arabia, which has Syria at the E. Egypt on the W. Palestine on the N. and Arabia Felix at the S. This part of Arabia is rocky, whence it has received its name. It is for the most part also covered with barren sands.

PETRAPIUM. (*petrapium*, from petra, a rock, and *apium*, parsley, so called because it grows in stony places. PETROSELINUM which see.

PETRARCH (Francis), a celebrated Italian of the 14th century, born at Arezzo, in 1304. His genius led him equally to poetry, eloquence, history, and moral philosophy, and the poems which he wrote on his Laura immortalized his name. His father was a Florentine, involved in the political factions of the Bianchi, and wished his son to study the law in aid of his views: but Petrarch was not fond of a court life, and preferred retirement; he therefore fixed his residence at Vaucluse, five miles from Avignon, where he devoted himself to literary pursuits. This spot became endeared to him from his love for the beautiful Laura de Noves, whom he first saw and passionately admired in 1627; but though the feelings of his heart were conveyed in the rapturous language of elegant poetry, he could, it is said, make no impression on the unkind fair. To divert his affections, he travelled, and after visiting Paris, Flanders, Germany, and Rome, he was persuaded to enter into the service of John XXII. The love of Vaucluse and of Laura, however, prevailed over the temptations of greatness; and Petrarch, once more restored to his favourite seat, again devoted his hours to studious pursuits, and to the praises of his beloved mistress. The sweetness of his poetry, and the graces of his muse, spread his celebrity beyond the confines of Avignon, and at the same moment he was solicited by the senate of Rome, by the university of Paris, and by the king of Naples, to come and receive the poetical crown. The offers of Rome, once the mistress of the world, and the cradle of poets, historians, and orators, were too flattering to be withstood, and the modest bard appeared in the capitol, where the poetic crown was fixed on his head with the most solemn ceremony on Easter-day, 1341, and he was declared a citizen of Rome. In 1343 he was drawn from his favourite Vaucluse by Clement VI. who sent him to compliment Joan on her accession to the Neapolitan crown. While at Verona, he was informed of the death of Laura, a melancholy event which deeply affected him, and which he immortalized by all the powers of poetry. In 1352 he bid adieu for ever to Vaucluse, which the death of Laura had converted from a scene of pleasure to melancholy reflection; and entering the service of the Visconti, he engaged in negociations. Though informed that his patrimony was restored by the Florentines, he preferred to these new honours the peaceful retreat of Arqua, near Padua, given him by his friend de Carrara, and there he died July 1374, aged 70. Petrarch was an ecclesiastic, though he never took priest's orders. He was in private life a very amiable character, and was guided by moderation, though flattered by the great, and honoured by the powerful. His passion for Laura was of the purest kind; though some have ventured to assert, that it was not unmixed with the most licentious concessions. Petrarch as a poet is deservedly

celebrated as one of the restorers of classical learning, and he displayed all the powers of genius and poetical inspiration, not only in his own native language, but in Latin. His sonnets are esteemed as the sweetest, the most elegant, and most highly finished verses ever written in Italian, and his songs possess equal beauty and grace. His Latin poems are not entitled to similar praise. His Africa, or the Punic war, is censured as faulty and unclassical. His other works are de remediis utriusque fortunæ, 4to. translated into French—de otio religiosorum—de verâ sapientiâ—de vitâ solitariâ—de contemptu mundi—rerum memorabilium libri sex—de republicâ optime administrandâ, &c. (*Lempriere*).

PETRE, or SALTPETRE. See NITRE.

PETREA, in botany, a genus of the class didynamia, order angiospermia. Calyx five-parted, very large, coloured, cored wheel-shaped; capsule two-celled, in the bottom of the calyx; seeds solitary. One species, a climbing shrub of America, with blue racemed flowers.

PETREL, in ornithology. See PROCELLARIA.

PETRE'SCENT. *a.* (*petrescens*, Latin.) Growing stone; becoming stone (*Boyle*).

PETRIFA'CTION. *s.* (from *petrifio*, Lat.) 1. The act of turning to stone; the state of being turned to stone (*Brown*). 2. That which is made stone.

PETRIFACTION, in natural history, the conversion of vegetable or animal materials into a stony substance. In this conversion these materials are more or less altered from their original state, according to the different fossils they have lain buried among: some of them suffering but little change, and others being highly impregnated with crystalline, spongy, pyritic, or other extraneous matter.

The present subject, as to the substances actually traced in a petrified state, belongs to that branch of science which has of late been denominated ORYCTOLOGY, and will be found treated of under that article. We shall here only briefly advert to the process by which it is probable the extraordinary effect of petrifaction in vegetable and animal materials is produced.

It is necessary, however, to premise, that petrifaction has by some mineralogists been understood in a much larger sense than that in which it is understood generally, and in which we mean to employ it ourselves; as importing the formation of stony substances of all kinds; and in this general view it has been divided into two parts; *lapidification* and *substitution*: the former relating to such stony materials as are native or primary minerals, as rocks and fragments of rocks, produced by the processes of aggregation, or cementation; and the latter relating to such as are secondary or adventitious, and produced by a conversion of some part of the vegetable or animal kingdoms into a stony form. It is to the last of these two divisions that the present article relates.

Among plants it is obvious that it can only be the harder or woody part that can alone be converted into a petrified state, since the more juicy parts are very rapidly decomposed by the process of putrefaction.

Even wood itself, in ordinary circumstances, whether upon the surface of the earth or buried under it, is gradually, by the concurrent action of air and water, decomposed; its texture is broken down, the connexion between the several vegetable principles of which it consists is dissolved, its ingredients enter into new combinations, and no vestige remains either of its organization or chemical properties. Sometimes, however, it happens that the external figure and internal arrangement are preserved, while the chemical properties have undergone a very obvious alteration, in consequence of which the natural decay is prodigiously retarded, and in various instances even wholly suspended: and it is under this last change that wood is said to be petrified or mineralized.

There are three substances by which this change is brought about, namely, pyrites, oxyd of iron, and siliceous earth, in the form of agate, or hornstone: each of which forms a distinct species of petrified wood.

Pyritous fossil wood occurs principally in the independent coal formation; it is composed entirely of common pyrite, often in a state of semi-decomposition; it appears to contain no ligneous particles, but retains with considerable exactness the external figure, and, in some degree, the internal organization, of wood. The reason why this species presents a less striking resemblance to wood than the others do, is probably the strong crystalline polarity which pyrite possesses. In splitting longitudinally a piece of pyritical wood, it not unfrequently happens that the fibres representing the concentric layers of wood are composed of minute cubes laterally aggregated to each other.

Ferruginous fossil wood is found in hematite, and especially in argillaceous iron ore. Externally it presents the appearance of trunks and branches, and its internal texture has a close resemblance to that of wood. In its chemical composition it does not appear to differ materially from common argillaceous iron ore.

Agatized wood, however, is that which has been chiefly examined, and which presents us with by far the most beautiful specimens of this kind of fossils. It has been made a distinct mineral species by Werner, who has given it the name of holstein or woodstone, of which the following are the characters.

Its colour is ash-grey, passing into greyish-black, yellowish, brownish, and blood-red; the colours run into each other, forming clouds and stripes in a longitudinal direction. It occurs in the shape of trunks, branches, and roots, and presents in the utmost perfection the internal organization of wood, not only the longitudinal fibres and concentric layers being visible, but even the knots and medullary processes. Its internal lustre is various, being

between glistening and dull. Its cross fracture is imperfectly conchoidal; its longitudinal fracture is splintery and fibrous. It is moderately translucent; is harder than glass, and gives fire with steel, but is easily frangible.

It occurs in sand and sand-stone, especially in the hill St. Symphorien near Etampes in France, in Saxony, Bohemia, and Hungary; near Loch Neagh in Ireland, in the beds of sand-stone that lie above the fuller's earth near Woburn in Bedfordshire, and also in the sandy deserts to the west of Egypt. See Nat. Hist. Pl. CVIII. CXII. and CXV.

It not unfrequently happens, that agatized wood before the petrifying process has begun, has been corroded by worms; in which case not only the perforations are filled with siliceous matter, but even the substance of the worm itself has been completely agatized.

Agatized wood discovers slight traces of its origin by affording a few drops of a watry empyreumatic liquor by distillation. It consists however, for the most part, of silex. The origin of petrified wood is generally attributed to the gradual infiltration of the petrifying material; but to this theory, simple, and ingenious, and plausible as it is, there are many objections that yet require to be removed. See the articles CHALCEDONIUS and OPALUS.

Petrified animal substances are produced in the same manner as petrified vegetable substances: and for the reason that we seldom meet with any of the softer parts of plants in a petrified form, we seldom also meet with any of the softer parts of animals; all these equally dissolving in so short a period as to give no opportunity, or nearly so, to the petrifying material, whether of pyritous or siliceous water or other fluid, to infiltrate itself into their vessels, and become substituted for their proper juices before the whole is completely destroyed and wasted away. Hence it is chiefly the bones of quadrupeds, birds, and other animals of the higher classes, and the crusts and shells of insects and worms, that are discovered in this state: upon which we have already written at some length in the article ORYCTOLOGY, and now refer the reader to it.

PETRIFA'CTIVE. *a.* (from *petrifacio*, Lat.) Having the power to form stone (*Bro.*).

PETRIFICATION. *s.* (*petrification*, Fr.; from *petrify*.) A body formed by changing other matter to stone (*Boyle*).

PETRI'FIC. *a.* (*petrificus*, Latin.) Having the power to change to stone (*Milton*).

To PE'TRIFY. *v. a.* (*petrifier*, Fr.; *petra* and *fio*, Latin.) 1. To change to stone (*Woodward*). 2. To make callous, or obdurate.

To PE'TRIFY. *v. n.* To become stone (*Dryden*).

PETRIKOW, a town of Great Poland, in the palatinate of Siradia, 80 miles S.W. of Warsaw. Lon. 19. 46 E. Lat. 51. 12 N.

PETRILITE, in mineralogy, a species of feldspar. See FELDSPATUM.

PETRINA, or PETRINIA, a strong town of Austrian Croatia, seated on the Petrina, 27 miles E. of Carlstadt. Lon. 16. 0 E. Lat. 46. 0 N.

PETROBRUSSIANS, a religious sect, which had its rise in France and the Netherlands about the year 1110. The name is derived from Peter Bruys, a Provençal, who made an attempt, in most respects laudable, to reform the abuses and remove the superstition that disgraced the beautiful simplicity of the gospel. His followers were numerous; and for 20 years his labour in the ministry was exemplary and unremitted. He was, however, burnt in the year 1130 by an enraged populace set on by the clergy.

The chief of Bruys's followers was a monk named Henry; from whom the Petrobrussians were also called Henricians. Peter the Venerable, abbot of Clugny, has an express treatise against the Petrobrussians; in the preface to which, he reduces their opinions to five heads. 1. They denied that children before the age of reason can be justified by baptism, in regard it is our own faith that saves by baptism. 2. They held that no churches should be built, but that those that already are should be pulled down; an inn being as proper for prayers as a temple, and a stable as an altar. 3. That the cross ought to be pulled down and burnt, because we ought to abhor the instruments of our Saviour's passion. 4. That the real body and blood of Christ are not exhibited in the eucharist, but merely represented by their figures and symbols. 5. That sacrifices, alms, prayers, &c. do not avail the dead.

PETROCARYA, in botany, a genus of the class heptandria, order monogynia. Calyx five-cleft; corol five-petalled; stamens fourteen, of which seven are barren; drupe fleshy, fibrous; nut two-celled with a single seed in each cell. Two species, trees of Guiana.

PETROLEUM, in mineralogy, a species of BITUMEN, which see.

PE'TRONEL. *s.* (*petrinal*, French.) A pistol; a small gun used by a horseman (*Hudibras*).

PETROMYZON. Lamprey. In zoology, a genus of the class pisces, order chondropterigia. Head slenderer than the body; mouth longer above than beneath; teeth orange, hollow within, and surrounded with a fleshy margin, above a little curved, beneath broad; spiracles seven on each side of the neck; on the nape a fistulous opening; without pectoral and ventral fin. These adhere firmly to rocks and other bodies by the mouth, the edges of which are jagged; the body is eel-shaped, slippery and mucous: they live a long time out of the water, and feed on worms, insects, less fishes, and dead bodies; belly long, narrow; vent near the pinnate tail; dorsal fins two; round the eyes numerous perforations; tongue semilunar, hard; teeth serrate. Four species.

1. M. marinus. True lamprey. Sea-lamprey. Mouth papillous within; second dorsal fin distinct from the tail. The name petromyzon, or lampetra, as it is sometimes called, is descriptive of its faculty of sucking

or adhering to stones and other substances, which it does with such tenacity as not to be drawn off without difficulty. A lamprey of three pounds weight has been known to raise a stone of twelve pounds, when seized hold of by the hand. This amazing power of suction must arise from the animal's exhausting the air within its body by the hole over the nose; while the mouth is closely fixed to the object, and permits no air to enter. The weight which the lamprey is by this means able to sustain will be equal to that of a column of air of the same circumference with the animal's mouth.

The lamprey sometimes grows so large, as to weigh four or five pounds; its colour is dusky, irregularly marked with dirty yellow. In the mouth are placed twenty rows of small teeth, disposed in circular orders, and placed far back near the throat, four, five, and six, in each row. The branchiæ are situated within the seven apertures, that are found on each side of the neck. Though in shape this animal resembles an eel, yet it is of a thicker and more clumsy form.

The sea lamprey, we should imagine from its name, was only produced in the salt water; it is traced, however, very frequently at the opening of large rivers, where they join the ocean. At certain seasons it is found in many of the British rivers, and also in the Irish. They are sea fishes; but, like salmon, quit the salt waters, and mount the rivers about the end of winter, and after remaining there for a few months, return again to the ocean.

As our manners are probably still far short of that sensuality and extravagance which distinguished the ancient Romans, we do not hear so many fanciful encomiums on particular fishes, nor such enormous sums paid to procure them. Accordingly, the lamprey known among us has obtained no very extraordinary character. It is differently estimated, according to the season in which it is taken, or the place where it is fed. The best season for them is the months of March, April and May; for they are more firm immediately on their arrival in the rivers from the salt water than afterwards. Towards the summer, and in the hot weather, when they have deposited their spawn, they are observed to be much wasted; and their flesh becomes flabby. Those caught in several of the rivers in Ireland the people will not venture to touch; and throughout the whole of Scotland they are held in detestation: while those taken by the English in the Severn are considered as the most delicate of all fishes whatever.

At a very early period, we find, the lamprey was reckoned a great delicacy by the English: that they are a heavy surfeiting food, the experience of one of our monarchs has fatally testified; for the death of Henry I. was occasioned by eating too plentiful a meal of these fishes. Notwithstanding this accident, they seem to have continued in high esteem long afterwards, for we find Henry IV. granting protection to such ships as brought over lampreys for the table of his royal consort; and his successor issuing out a warrant to William of Nantes, for supplying him and his army with these fishes, wherever they might happen to march.

In proof of the ancient predilection of the English for this fish, it is a custom, from time immemorial, for the city of Gloucester to present annually his majesty with a lamprey pye, covered with a large raised crust. As the gift is made at Christmas, it is with great difficulty the corporation can procure any fresh lampreys at that early season, though they offer a sum far exceeding their usual price.

The fishes of this genus, from some peculiarity in their conformation, generally swim with their body on a level with the surface of the water; and, it is said, can easily be suffocated, by being immersed in it for any considerable time. From this circumstance, it is probable that they require a frequent supply of air for breathing, and they may fairly be regarded as amphibials.

The female, when ready to spawn, digs a hole in the mud, where she deposits her ova; and in this operation, the power of suction, which we have already described, is of singular advantage; for, should she meet with a stone, though of considerable bulk, she raises and carries it out of the way. After the ova are excluded, and buried in the excavation thus formed, the parent remains in the neighbourhood till the young are quickened into life. She is then seen, with her numerous family playing around her; which, as soon as they have acquired sufficient strength, she gradually conducts to the sea.

2. P. fluviatilis. Lesser, or river lamprey. Second dorsal fin angulate.

This species is smaller than the former, seldom exceeding fourteen inches in length, and is also distinguished by transverse lines of a blackish colour. The mouth is of the same round form as in the preceding, and is possessed of the same adhesive power. On the upper part of it is a large bifurcated tooth; on each side there are three rows of very minute ones; and on the lower part there are seven, the exterior of which on each side is the largest; body above blackish, varied at the sides, whitish beneath.

Like all the other fishes of this genus, there is between the eyes a spout-hole or orifice, resembling that of the cetaceous fishes, and probably destined for a similar purpose, that of ejecting water from the throat and lungs. The back fin of the river lamprey is not continued uninterrupted to the tail, but is broken off; and behind it there rises a second, which goes round the tail, terminating at the anus.

This species, as well as the larger kind, is also eaten, potted and highly seasoned: by some it is preferred to the sea lamprey, as being milder tasted. All these fishes are probably heavy and unwholesome; and rather recommended by the epicure than the physician. They are taken in such vast numbers in the Thames, the Severn, and the Dee, that they constitute

a considerable branch of trade. They are sold to the Dutch, who use them for bait in the cod fishery: besides what are consumed in England, 450,000 have been exported in a season for this purpose, at two pounds per thousand. This species is also found in Japan and the lakes of South America

3. P. [illegible]ialis. Pride. Lampern. Second dorsal fin near: mouth lobate.

This species is exceedingly small, being only from six to eight inches long. It is a British fish, but found also in the rivers of Germany and Italy. In the river Isis, and other streams near Oxford, they are abundant, where, instead of concealing themselves, they roll in the mud, and never are observed to adhere to the stones, like the other lampreys.

The back is of a livid colour, approaching to black; the belly silvery, and more resplendent than the larger kinds. The mouth is of an elliptical shape; within it are six or seven teeth, and above them a small semicircular bone Upon the top of the head is a small tube, or aperture, like the cetaceous fishes: the belly swells and contracts alternately, as in those animals which breathe by means of lungs. It has two dorsal fins; the first rising about the middle, and supported by small tendons, that are scarcely visible; the other takes its rise immediately behind it, surrounds the tail, and terminates in the middle space, between the tail and the anus.

4. P. planeri. Planer's lamprey. Body annulate; mouth papillous: teeth in a single row, with others close behind them; breast thicker than in the others. Inhabits the fresh water rivers of Thuringia and other parts of Germany.

PETRONIUS. The most celebrated of this name is a great favourite of the emperor Nero, and one of the ministers and associates of all his pleasures and his debauchery. He was naturally fond of pleasure, and effeminate, and passed his whole nights in revels and the days in sleep. He was affable in his behaviour, and his witticisms and satirical remarks appeared artless and natural. He was appointed proconsul of Bithynia, and afterwards consul, in both of which employments he behaved with all the dignity becoming the successors of a Brutus or a Scipio, but with his office he laid down his artificial gravity, and again gave himself up to the pursuits of pleasure. He did not long enjoy the imperial favours. Tigellinus, likewise one of Nero's favourites, jealous of his fame, accused him of conspiring against the emperor's life. The accusation was credited, and Petronius withdrew himself from Nero's punishments by a voluntary death. This was performed in a manner altogether unprecedented, A. D. 66. Petronius ordered his veins to be opened, but had them closed at intervals, until at last nature was exhausted. Petronius distinguished himself by his writings as well as by his luxury and voluptuousness. He is the author of many elegant but obscene compositions still extant, among which is a poem on the civil wars of Pompey and Cæsar. There is also the feast of Trimalcion, in which he paints the pleasures and the debaucheries of a corrupted court and monarch, &c. The best editions of this classic are those of Burman at Utrecht, in 1709, and 1743; and that of Antonius at Leipsic, in 1783, with an excellent preface and several erudite notes.

PETRO-SALPINGO-STAPHILINUS, in myology. See LEVATOR PALATI.

PETROSELINUM. (from πετρα, a rock, and σελινον, parsley.) Common parsley. The APIUM PETROSELINUM of Linnéus, which see.

PETROSILEX, in mineralogy, a genus of the class earths, order siliceous. Consisting of the greater part silica, about 22 per cent of alumina, and 6 per cent of carbonat of lime; hardish, lightish; found in primæval stratified mountains, without lustre, breaking into indeterminate fragments, of a splintery texture; melting before the blow-pipe. Three species.

1. P. apacus. Hornstone. Chert. Nearly opake, of a common form: sometimes with a texture resembling small splinters; sometimes with the colours alternating in strata; sometimes with a texture resembling larger splinters; sometimes of a greenish colour. Found in Sweden and Germany, forming veins and beds of mountains, and frequently in nodules like kernels in rocks; colour usually blue-grey, sometimes grey, blue and green of various shades; by breathing on it discovers an earthy smell, and is sometimes so hard as to strike fire with steel; it decomposes sooner than flint, and does not take so high a polish: in the fire it decrepitates and whitens: specific gravity from 2,699 to 2,708: contains,

Silica	72
Alumina	22
Carbonat of lime	6
	100 *Kirwan.*

2. P. diaphanus. Semipellucid petrosilex. Silex petrosilex. Found with the last species; colour grey, white, ochraceous, rosy, flesh-colour, brownish-red, yellowish or reddish-brown, green or variegated: often receives a fine polish.

3. P. crystallinus. In rough crystals, which are frequently hollow within. These are of many varieties.

α. In six-sided perfect prisms.
β. Six-sided prisms, terminated on each side by convex surfaces.
γ. Six-sided prisms, terminated on each side by a three-sided pyramid.
δ. Cubes.
ε. Six sided tables.
ζ. Double four-sided pyramids.
η. Double three-sided pyramids.
θ. Double three-sided depressed pyramids.
ι. Single three-sided minute pointed pyramids.

Found in Saxony near Schneeburg, sometimes covered with a thin earthy coating.

PETTAPOLLY, a seaport of Hindustan, on the coast of Coromandel, where the Dutch

have a factory, 48 miles S.W. of Masulipatam. Lon. 80 46 E. Lat. 15. 49 N.

PETTAW, a town of Austria, in the duchy of Stiria. It belongs to the bishop of Saltsburg, and is seated on the Drave, 28 miles S. by E. of Gratz. Lon. 15. 37 E. Lat. 46. 46 N.

PETTEIA, in music, the last of the three parts into which the melopæia of the ancients was subdivided.

PETTICOAT. *s.* (*petit* and *coat.*) The lower part of a woman's dress (*Suckling*).

PETTIFOGGER. *s.* (corrupted from *pettivoguer*; *petit* and *voguer*, French.) A petty small-rate lawyer (*Swift*).

PETTINESS. *s.* (from *petty.*) Smallness; inconsiderableness; unimportance (*Shakspeare*)

PETTISH. *a.* (from *pet.*) Fretful; peevish (*Creech*).

PETTISHNESS. *s.* (from *pettish.*) Fretfulness; peevishness (*Collier*).

PETTITOES. *s.* (*petty* and *toe.*) 1. The feet of a sucking pig. 2. Feet in contempt (*Shakspeare*).

PETTO. *s.* (Italian.) The breast; figuratively, privacy.

PETTY. *a.* (*petit*, French.) Small; inconsiderable; inferiour; little (*Stillingfleet*).

Petty whim, in botany. See Genista.

Petty (Sir William), son of Anthony Petty a clothier, was born at Rumsey, a little haven-town in Hampshire, in 1623; and while a boy took great delight in spending his time among the artificers there, whose trades he could work at when but twelve years of age. Then he went to the grammar-school there: at 15 he was master of the Latin, Greek, and French tongues, and of arithmetic and those parts of practical geometry and astronomy useful in navigation. Soon after he went to Caen in Normandy, and Paris, where he studied anatomy, and read Vesalius with Mr. Hobbes. Upon his return to England he was preferred in the king's navy. In 1643, when the war between the king and parliament grew hot, he went into the Netherlands and France for three years; and having vigorously prosecuted his studies, especially in physic, at Utrecht, Leyden, Amsterdam, and Paris, he returned home to Rumsey. In 1647, he obtained a patent to teach the art of double writing for seventeen years. In 1648, he published at London, Advice to Mr. Samuel Hartlib, for the Advancement of some particular Parts of Learning. At this time he adhered to the prevailing party of the kingdom; and went to Oxford, where he taught anatomy and chemistry, and was created a doctor of physic. In 1650, he was made professor of anatomy there, and soon after a member of the college of physicians in London. The same year he became physician to the army in Ireland; where he continued till 1659, and acquired a great fortune. After the Restoration, he was introduced to king Charles II. who knighted him in 1661. In 1662, he published A Treatise of Taxes and Contributions. Next year he was greatly applauded in Ireland for his invention of a double-bottomed ship. He died at London of a gangrene in the foot, occasioned by the swelling of the gout, in 1687.

The character of his genius is sufficiently seen in his writings, which were much more numerous than those we have mentioned above. Amongst these, it is said, he wrote the history of his own life, which unquestionably contained a full account of his political and religious principles, as may be conjectured from what he has left us upon those subjects in his will. In that he has these remarkable words: "As for legacies to the poor, I am at a stand; and for beggars by trade and election, I give them nothing: as for impotents by the hand of God, the public ought to maintain them: as for those who can get no work, the magistrates should cause them to be employed; which may be well done in Ireland, where are fifteen acres of improveable land for every head: as for prisoners for crimes by the king, or for debt by their prosecutors, those who compassionate the sufferings of any object, let them relieve themselves by relieving such sufferers; that is, give them alms, &c. I am contented, that I have assisted all my poor relations, and put many into a way of getting their own bread, and have laboured in public works and inventions, and have sought out real objects of charity; and do hereby conjure all who partake of my estate, from time to time to do the same at their peril. Nevertheless, to answer custom, and to take the sure side, I give twenty pounds to the most wanting of the parish wherein I die." As for his religion, he says, "I die in the profession of that faith, and in the practice of such worship, as I find established by the laws of my country; not being able to believe what I myself please, nor to worship God better than by doing as I would be done unto, and observing the laws of my country, and expressing my love and honour to Almighty God, by such signs and tokens as are understood to be such by the people with whom I live." He died possessed of a very large fortune, as appears by his will; where he makes his real estate about 6500l. per annum, his personal estate about 45,000l. his bad and desperate debts 30,000l. and the demonstrable improvements of his Irish estate 4000l. per annum; in all, at six per cent. interest, 15,000l. per annum. This estate came to his family, who were afterwards ennobled. The present marquis of Lansdowne is a lineal descendant.

The great variety of topics on which sir William wrote successfully, prove the extent and fertility of his genius. A complete list o his works is given in Dr. Hutton's Mathematical and Philosophical Dictionary, to which we beg to refer the curious reader.

Petty bag, an office in Chancery, the three clerks of which record the return of all inquisitions out of every county, and make all patents of comptrollers, guagers, customers, &c.

PETTY-CHAPS, in ornithology. See MOTACILLA.

PETTY-FOGGER, a low tricking attorney, without either skill or conscience.

PETTY or PETIT LARCENY. See LARCENY.

PETTY or PETIT TREASON. See TREASON.

PETULANCE. PE'TULANCY. *s.* (*petulance*, French; *petulantia*, Latin.) Sauciness; peevishness; wantonness (*Clarendon*).

PETULANT. *a.* (*petulans*, Latin; *petulant*, French.) 1. Saucy; perverse (*Watts*). 2. Wanton (*Spectator*).

PETULANTLY. *ad.* (from *petulant.*) With petulance; with saucy pertness.

PETUNSE, in the arts, one of the principal substances made use of in the manufacture of porcelain: the other is kaolin. Petunse consists of

Silex	74
Alumina	14.5
Lime	5.5
	94.0

Kaolin consists of

Silex	74
Alumina	16.5
Lime	2
Water	7
	99.5

Therefore the two together consist of silex and alumina, with less than 5 per cent of lime. See PORCELAIN.

PETWORTH, a town in Sussex, with a market on Saturday; seated near the Arun, 12 miles N.E. of Chichester, and 49 S.W. of London. Lon. 0. 34 W. Lat. 50. 58 N.

PEUCEDANUM. Sulphur-wort. Meadow-saxifrage. In botany, a genus of the class pentandria, order digynia. Fruit ovate, striate on both sides, surrounded with a membrane; calyx five-parted; involucres very short; florets of the center abortive. Eleven species: for the most part natives of warm climates; two indigenous to our country, as follows.

1. P. Silaus. Common meadow saxifrage. Leaflets pinnatifid, with opposite decurrent segments; general involucre about two-leaved. Found wild in our meadows, and employed occasionally in medicine under the name of SAXIFRAGA VULGARIS, which see.

2. P. officinale, called by some medical writers marathrum sylvestre, marathrophyllum, or pinastellum. Hog's-fennel; horse-tongue; common sulphur-wort. Leaves five-times three-parted, with linear, undivided segments. Found wild in our ditches. The root is the officinal part; it has a strong fetid smell, somewhat resembling that of sulphureous solutions, and an acrid, unctuous, bitterish taste. Wounded when fresh in the spring or autumn, particularly in the former season, in which the root is most vigorous, it yields a considerable quantity of yellow juice, which soon dries into a solid gummy resin, which retains the taste and strong smell of the root. This, as well as the root, is recommended as a nervine and anti-hysteric remedy.

PEUCESTES, a Macedonian, set over Egypt, by Alexander. He received Persia at the general division of the Macedonian empire at the king's death, and behaved with great cowardice after he had joined himself to Eumenes.

PEUCETIA, a part of Italy, near Campania, called also Mesapia and Calabria. It received its name from Peucetus, the son of Lycon, of Arcadia.

PEVENSEY, a village in Sussex, situate on a small river, which runs into a bay of the English Channel, called Pevensey Harbour, 14 miles W.S.W. of Hastings. Here is an ancient castle, which belonged to Robert earl of Moreton, and is said to be the largest and most entire remain of Roman building to be seen in Britain. Pevensey was anciently a famous haven, though now it is nearly two miles from the sea. Here Swain landed in 1049, when he carried off his cousin Beorn and murdered him: Godwin, and his son Harold, afterward ravaged it, and took away many ships: and here William the Conqueror landed when he invaded England.

PEW. *s.* (*puye*, Dutch.) A seat enclosed in a church (*Addison*).

PEWIT, in ornithology. See TRINGA.

PEWTER, a factitious metal, used in making domestic utensils, as plates, dishes, &c. The basis of this metal is tin, which is converted into pewter, by mixing at the rate of an hundred weight of tin, with fifteen pounds of lead, and six pounds of brass. Besides this composition, which makes the common pewter, there are other kinds compounded of tin, regulus of antimony, bismuth and copper, in several proportions. See ZINCUM.

PEWTERER, one who works in pewter.

PEYRERE (Isaac), librarian to the prince of Condé, and author of Præadamitæ, &c. a book condemned to the flames, and causing its writer to be imprisoned at Brussels. He was, however, released through the interest of the prince, and after some time retired to the Seminaire des Vertus, where he died, in 1676, aged 84.

PEZAY (Masson, marquis of), a native of Paris, and instructor in the art of tactics to Louis XVI. He was afterwards appointed inspector-general to the coasts, but dismissed and banished to his own estates for reasons not publicly known. He wrote Les Soirées Helvetiennes, with several other poems, as also Les Campagnes de Maillebois. He died in 1778.

PEZENAS (Esprit), a learned jesuit, of Avignon, in 1692, and some time professor of physic at Marseilles. His works and translations are numerous, and esteemed for the perspicuity of the language.

PEZIZA. Cap-mushroom. In botany, a

genus of the class cryptogamia, order fungi. Fungus concave, hemispherical, or campanulate, without visible fructification. Seventy-two species, of which fifty-six are indigenous to our own country. They may be thus subarranged.

A. Sessile.

B. On a stalk, containing the larger number.

C. Gelatinous.

PEZRON (Paul), a very learned and ingenious Frenchman, born at Hennebon in Brittany in 1639, and admitted into the order of Citeaux in 1660. He was a great antiquary, and was indefatigable in tracing the origin of the language of the Goths; the result of which was, that he was led to espouse a system of the world's being much more ancient than modern chronologers have supposed. This he communicated to the public in a treatise printed at Paris in 1687, 4to, entitled, The antiquity of Time restored, and defended against the Jews and modern chronologers. This book of Pezron's was extremely admired for the ingenuity and learning in it; yet caused no small alarm among the religious, against whom he nevertheless defended his opinions. He went through several promotions, the last of which was to the abbey of Charmoye, to which he was nominated by the king; and died in 1706.

PFAFENHOFEN, a town of Upper Bavaria, with a Benedictine monastery at a small distance. It is seated on the Ilm, 19 miles N.W. of Ratisbon. Lon. 12. 3 E. Lat. 49. 27 N.

PFIRT, or FORETTE, a town of France, in the department of Upper Rhine, 10 miles W. of Basil. Lon. 7. 20 E. Lat. 47. 37 N

PFORTZHEIM, a town of Suabia, in the marquisate of Baden-Durlach, with a castle, seated on the Entz, 15 miles S.E. of Durlach. Lon. 9. 46 E. Lat. 48. 57 N.

PFREIMB, a town of Upper Bavaria, with a castle, seated at the confluence of the Pfreint and Nab, 10 miles N.E. of Amberg. Lon. 12. 21 E. Lat. 49. 21 N.

PFULLENDORF, an imperial town of Suabia, seated on the Andalspatch, 37 miles S.W. of Ulen. Lon. 9. 27 W. Lat. 48. 6 N.

PHACA, in botany, a genus of the class diadelphia, order decandria. Calyx five-toothed, the two upper teeth more remote; legume half-two-celled, inflated. Twelve species, natives of the south of Europe and of Asia.

PHÆACIA, an island of the Ionian sea, near the coast of Epirus, afterward Corcyra. The inhabitants were a luxurious people, from which reason a glutton was generally stigmatized by the epithet of Phæax. When Ulysses was shipwrecked on the coast of Phæacia, Alcinous was then king of the island.

PHÆDON. The most remarkable of this name is a disciple of Socrates. He had been seized by pirates in his younger days, and the philosopher, who seemed to discover something uncommon and promising in his countenance, purchased his liberty, and ever after esteemed him. The name of Phædon is affixed to one of the dialogues of Plato.

PHÆDRA, a daughter of Minos and Pasiphae, who married Theseus, by whom she became mother of Acamas and Demophoon. She conceived an unconquerable passion for Hippolytus, the son of Theseus, by the amazon Hippolyte. Phædra long attempted to stifle it, but in vain, and in the absence of Theseus, she addressed Hippolytus. Hippolytus rejected her with horror. Phædra, incensed on account of the reception she had met, at the return of Theseus, accused Hippolytus of attempts upon her virtue. The credulous father listened to the accusation, and without hearing the defence of Hippolytus, banished him, to punish him in some exemplary manner. As Hippolytus fled from Athens, his horses were suddenly terrified by a sea monster, which Neptune had sent on the shore. He was dragged through precipices and over rocks, trampled under his horses, and crushed under the wheels of his chariot. When the tragical end of Hippolytus was known at Athens, Phædra confessed her crime, and hanged herself in despair.

PHÆDRUS, the author of five books of Latin Fables in Iambic verse. He was a Thracian by birth, and contemporary with Julius Cæsar. He lived to be very old, and his being called Augustus's freedman shows that he had been a slave to that emperor. Under Tiberius he was unjustly persecuted by Sejanus, to which circumstance he has alluded in his Fables, and particularly in the preface to his third book. It is somewhat singular that the Roman language has been transmitted to posterity in its greatest purity and elegance by two slaves, who were brought from countries deemed barbarous: and it is no less remarkable that the Fables of Phædrus should remain buried in libraries unknown to the public, until discovered by Pithon, a learned Frenchman, at the close of the 16th century.

PHÆNOMENON. *s.* See PHENOMENON. This has sometimes *phænomena* in the plural. (φαινομενον.) An appearance in the works of nature (*Newton*).

PHAETHUSA, in botany, a genus of the class syngenesia, order polygamia superflua. Receptacle chaffy; downless; seeds bristly; calyx imbricate; florets of the ray from one to three. One species, a North American tree eighteen feet high.

PHAETON, in fabulous history, a son of the Sun, or Phœbus and Clymene, one of the Oceanides, according to Ovid. Venus became enamoured of him, and entrusted him with the care of one of her temples. This favour of the goddess rendered him vain, and when Epaphus, the son of Io, had told him, to check his pride, that he was not the son of Phœbus, Phaeton resolved to know his true origin, and he visited the palace of the sun. He begged Phœbus, if he really were his father, to give him incontestable proofs of his

tenderness, and convince the world of his legitimacy. Phœbus swore by the Styx, that he would grant him whatever he required; and no sooner was the oath uttered, than Phaeton requested to drive his chariot for one day. Phœbus represented the dangers to which this would expose him, but in vain. He undertook the aerial journey, and the explicit directions of his father were forgotten. No sooner had Phaeton received the reins, than he betrayed his ignorance of guiding the chariot. The flying horses became sensible of the confusion of their driver, and immediately departed from the usual track. Phaeton repented too late of his rashness, and already heaven and earth were threatened with an universal conflagration, when Jupiter, who had perceived the disorder of the horses, struck the rider with a thunder-bolt, and hurled him headlong from heaven into the river Po. His body, consumed with the fire, was found by the nymphs of the place, and honoured with a decent burial. His sisters mourned his unhappy end, and were changed into poplars by Jupiter.

PHAETON, in ornithology, tropic-bird; a genus of the order anseres. Bill sharp-edged, straight, pointed, the gape of the mouth reaching beyond; nostrils oblong; hind-toe turned forward. Three species, as follow:

1. P. æthereus. Common tropic-bird. Body white; back, rump, and less wing-feathers streaked with white; two middle tail-feathers black at the base; bill red.

There are two other varieties, from a slight variation in the colours.

Inhabits the tropics, and are often seen upon the backs of porpoises; seldom on land, except in breeding time: about two feet ten inches long; flies very high; and feeds on fishes.

2. P. melanorhynchos. Black-billed tropic-bird. Streaked black and white, beneath white; bill black; quill-feathers tipt with white, tail-feathers with black. Inhabits Palmerston and Turtle Islands: nineteen and a half inches long.

3. P. phœnicurus. Red-tailed tropic-bird. Rosy flesh-colour; bill and two middle tail-feathers red. Inhabits Mauritius Island: two feet ten inches long, of which the two middle tail-feathers measure one foot nine inches; builds in hollows in the ground, under trees; and lays two yellowish-white eggs with rufous spots.

PHAETONTIADES or PHAETONTIDES, the sisters of Phaeton, who were changed into poplars by Jupiter.

PHAETUSA, one of the Heliades, changed into poplars after the death of their brother Phaeton.

PHAGEDE'NA. *s.* (φαγεδαινα; from φαγω, to eat.) An ulcer, where the sharpness of the humours eats away the flesh.

PHAGEDE'NIC. PHAGEDE'NOUS. *s.* (*phagedenique*, Fr.) Eating; corroding (*Wiseman*).

PHALÆNA. Moth. In zoology, a genus of the class insecta, order lepidoptera. Antennas gradually tapering from the base to the tip; tongue spiral; jawless; wings when at rest, generally deflected; flight nocturnal. Sixteen hundred species. These fly abroad only in the evening and during the night, and feed on the nectar of flowers: the larve is active and quick in motion, mostly smooth, more or less cylindrical, and preys voraciously on the leaves of various plants: pupe quiescent, more or less cylindrical, pointed at the tip or at both ends, and is generally inclosed in a follicle. They are divided into the following sections:

A. bombyx. Antennas filiform; feelers two, compressed, reflected; tongue short, membranaceous, obtuse, bifid; larve sixteen-footed, often hairy; pupe pointed at the tip. These are subdivided again:

α Wings expanded.
β Wings reversed.
γ Wings deflected.
δ Wings incumbent.
ε Wings convolute.

B. geometra. Antennas filiform; feelers cylindrical; tongue projected, membranaceous, setaceous, bifid; larve eight or ten-footed; six of the feet pectoral, two caudal, and sometimes two subcaudal; pupe pointed at the tip. Thus again subdivided:

α Antennas pectinate.
β Antennas setaceous.
γ Wings forked, connivent.

C. noctua. Antennas setaceous; feelers compressed, hairy, the tip cylindrical and naked; tongue projecting, horny, setaceous, bifid; larve sixteen-footed; pupe pointed at the tip. Subdivided as follows:

α Wings expanded.
β Wings flat, incumbent; thorax smooth.
γ Wings flat, incumbent; thorax crested.
δ Wings deflected; thorax smooth.
ε Wings deflected; thorax crested.

D. hyblœa. Antennas setaceous; feelers projecting, compressed, dilated in the middle; lip projecting, acute.

E. hepialus. Antennas moniliform; feelers two, reflected, hairy, between them is the rudiment of a bifid tongue; larve sixteen-footed, that feed on the roots of plants; pupe folliculate, cylindrical, and pointed at the tip.

F. cossus. Antennas short, filiform; feelers two, very short, cylindrical, reflected; without spiral tongue.

G. pyralis. Antennas filiform; feelers two, equal, almost naked, cylindrical at the base, the middle dilated into an oval, and subulate at the tip; tongue projected, setaceous, bifid; wings very obtuse, and slightly curved at the exterior margin; larve sixteen-footed, rolling up the leaves to which it attaches itself.

H. tinea. Antennas setaceous; feelers four, unequal; larve found in houses, among linen and woollen cloths and fur-

niture, in which it eats holes and to which it is very destructive.

I. allucita. Antennas setaceous; feelers two, divided to the middle, the inner division very acute.

K. pterophorus. Antennas setaceous; feelers two, linear, naked; tongue exserted, membranaceous, bifid; wings fan-shaped, divided down to the base, and generally subdivided as far as the middle; larve sixteen-footed, ovate, hairy; pupe naked, subulate at the tip.

The greater part of this numerous tribe, when at liberty in the fields, only fly during the night, or towards the evening: when domesticated in boxes made for that purpose, they give indications by their fluttering within when the natural period of their activity approaches. During the day they remain quiet, and apparently reconciled to their confinement; they flutter throughout the whole extent of their prisons towards the close of day, and testify their impatience at their want of freedom.

All the butterflies are provided with a rostrum for gathering, and for the reception of their food; a great part of the moths are entirely destitute of such an organ, while in others it is so small as scarcely to be discernible with the naked eye. This singular fact hath been fully investigated by the indefatigable Reaumur, who, after examining many moths with a strong magnifier, has not been able to trace the smallest vestige of a mouth. A considerable number, therefore, of these animals must pass the whole of their winged state without food; nor can they be destructive to vegetable or animal substances, except while they remain in the form of worms.

The larves or caterpillars from which the various species of moths are produced, exhibit nearly the same variety of appearance as the winged insects which spring from them. Some are large, while others are extremely minute; many are provided with ten, others twelve and fourteen feet; the largest and most common have sixteen. Some of the smaller caterpillars are smooth, and others covered with hairs, which produce an itching and an inflammation when they touch the human skin.

All the caterpillars of phalænæ, after having several times cast their skin, spin for themselves the materials of a habitation, in which they are to be transformed into chrysalids. Of all the inventions of insects to protect themselves during this state of imbecility, that practised by the silk worm is most universally known; and if animals acquire a consequence or reputation from their connection with man, and the conveniences with which they accommodate him, this insect may challenge, perhaps, a larger share of it than any other animal whatever. Our luxury has brought silk into such general request, that it may now be deemed a necessary of life: the poor, in some countries at least, would find it almost impossible to procure the necessary articles of clothing, were woollen stuffs worn by all those who at present are supplied with silk.

The produce of the phalæna mori, or common silk worm, has been found most proper for the purpose of manufacturing. That glutinous substance with which the silk of this species is always covered when it first comes from the worm, and which gives it that adhesive quality so proper for constructing their edifices, sooner dries than in that of any other insect. The cods constructed by some other species are so firmly glued together, that no operation can separate the threads. The produce of many is by far too fine for any purpose in our manufactures, while that of another class is too coarse.

Several very laudable attempts have been made, but hitherto without any considerable degree of success, to rear the silk worm in Britain. The public have lately been informed by a manufacturer of Paisley of his having prepared a web entirely of the silk produced by worms of his own rearing. And in the transactions of the society for the encouragement of arts, manufactures, and commerce, a number of very useful experiments are recorded with regard to the food and management of these insects.

Probably the want of a sufficient number of mulberry trees has hitherto rendered ineffectual the efforts of our countrymen to introduce and rear any considerable quantity of silk worms. From the attempts that have already been made, it appears that the white mulberry is preferable to the black in feeding, and that the latter is to be preferred to the lettuce. Twelve cocoons, the produce of worms fed upon the white mulberry, weighed seven penny-weights two grains; while an equal number of those that had been fed upon the black mulberry weighed only six penny-weights three grains: six penny-weights were obtained from the same number of worms fed upon common lettuce.

Endeavours to produce raw silk in our own country seem the more worthy of encouragement, as we appear to possess some advantages of which Italy and many other silk countries are destitute. In Italy the chrysalids so soon come to life, that it is necessary to destroy them, lest, by eating their way out, they should injure the silk. In order to effect this, they are collected and placed in heated ovens, where again the silk, without singular caution, is apt to be damaged. In our own climate, where every progression of the insect tribe is slower, there is sufficient time to wind off the silk without killing the chrysalis.

But beside the injury that may be done to the silk in Italy, from the length of time which it is necessary to keep the chrysalis in these ovens, they are there obliged to suffer the moth to eat its way out of the largest cones, in order to have eggs from the most vigorous and healthy. Hence they lose all the silk of these cones, which, in our own country, might be gathered while the moths are preserved. Thus we seem to possess two striking advantages,

which may probably compensate for the want of others which our climate has denied us.

Yet our climate itself is in some respects superior to those where silk is raised. In the south of France the frosts are often so intense as to kill the mulberry leaves after they are out. At that season of the year, this is seldom the case in England; which is also more free from lightning, and those sultry heats that have always been deemed prejudicial to the silk worm. From such considerations the time may perhaps arrive when our countrymen, by farther knowledge and experience, may be enabled to avail themselves of these exclusive advantages, and become entitled to a rank as distinguished among the raisers, as that which they have long held among the manufacturers of silk.

The silk worm, however, is far from being the only insect of whose labours man might probably avail himself. There are many species very common, and immensely fertile, that might be beneficially employed in procuring silk, did we know how to profit of their labours. M. de Reaumur has mentioned several whose productions deserve a trial, although we are aware that the silk of many of them is altogether unfit for our purposes; their coques being not only coarse, but so scantily provided with silk, that the animal is obliged to join dry leaves, bits of wood, and other materials, in order to give stability to its edifice. Some of them indeed spin under ground, and their work consists only of joining and connecting together, by means of their threads, different particles of earth, of which their house is composed. These caterpillars, when kept by the naturalist, who waits for their perfect form, must be supplied with earth in the boxes in which they are lodged; otherwise they will perish, from not being able to construct an edifice fit for their reception.

The moths differ from the butterflies in remaining in their chrysalid state for a much longer period before their metamorphoses into perfect insects is completed. Their form, too, is then different, being oblong, and not angular, like the chrysalid of the butterfly. Some remain in their coques for several years successively; especially if a cold damp situation have retarded their progress. So great is the effect of heat in precipitating their developements, that a moth in a warm exposure may be produced from its chrysalid, even in the depth of winter.

After the phalænæ issue from their last covering, some of them are destitute of wings: these are the females of certain kinds, who, instead of wings, have only short protuberances, altogether unfit for the purpose of flying. They have the appearance of large creeping animals of a different order, and can only be recognised for moths by the shape of their antennas, which are similar to those of the males, and by those scales with which the body of these animals is covered.

Though the moths do not in general fly by day, yet it is the light which, at evening, attracts them into the dwellings of man: then it is that they are seen entering the rooms, and fluttering around the candles, where they often meet with a painful death. This fondness for light has suggested to the curious a method of catching moths, by carrying a lantern into a bower, around which they all flock, when the greater part may be led into captivity.

Out of this almost innumerable tribe of insects we can select but a few specimens.

1. P. mori. Common silk worm. Wings pale, with three obsolete brown streaks. We have already made some observations on the produce of this curious moth, and have now only to remark that, in its native state, it inhabits China, on the mulberry tree, whence its specific name, and was introduced into Europe in the reign of the emperor Justinian: it is the fine silky threads which compose the follicle of the pupe, that are converted into that valuable article of commerce and luxury, in our own country denominated silk. This species belongs to the partition bombyx: the larve is characterised by having the tail naked and whitish; the pupe is folliculate, reddish-brown.

2. P. atlas. Wings foliate, varied with yellow, white, and ferruginous, with a transparent spot on each, that on the upper pair with a contiguous smaller one. This is the largest and most splendid of all the phalænæ yet known: the extent of its wings measures not less than eight inches and a half. It is a native of both the Indies; and occasionally varies in size and colours. It belongs to the partition bombyx: the larve is verticillate with hairy tubercles, and spins a web of very strong yellowish silk.

3. P. luna. Wings tailed, both surfaces alike; colour elegant peagreen, with a transparent lunule eye on each wing; the upper wings have a dark-brown rib which extends across the thorax; body covered with white wool. It inhabits North America.

4. P. pavonia. Wings rounded, clouded with grey and barred with grey beneath, each of them with a nictitant semitransparent eye. The most beautiful European insect of the bombyx partition: its wings, when extended, measure about six inches. It is subject to several varieties in its size, and the disposition of its markings; the larve is gregarious and green, verticillate with red or yellow, hairy protuberances; pupe blackish, folliculate, with an elastic aperture at the rib. It is occasionally found in our own country.

5. P. sambucaria. Wings tailed, angular, yellowish with two darker streaks; lower ones with two reddish dots at the tip. It is an elegant moth, of a pale sulphur colour, found in June and July on the leaves of the elder tree, whence its specific name. Its chrysalis is black, and may be readily traced in the month of May in the same situation. It belongs to the partition geometra.

6. P. vestianella. Cloth-moth. Wings

cinereous with a white rib, the tips ascending and feathered. This insect belongs to the tinea division, and is the common moth found in cloths and woollen furniture, and so destructive to them.

7. P. sarcitella. Wings cinereous, thorax with a white dot on each side. This also belongs to the division tinea, and is found in skin-cloths and woollen furniture, to which, like the last, it proves terribly destructive.

These moths construct the abode in which they reside of the grains of wool or other materials, which they gnaw off. Their food is of the same substance; and what greatly increases the extent of their devastations is, that every step they advance upon cloth, feeling themselves incommoded by the wool in their way, they gnaw a smooth passage for themselves, like a man with a scythe in his hand, cutting down the grass of the meadow as he proceeds. Hence these species are among the most destructive of the tribe. The most costly articles of fur are those which are not worn every day; and for this very reason they are most exposed to their attacks. The methods for preventing their devastations may be reduced to the two following; either we must destroy the insects, or render our clothes disagreeable food for them. The insects may be destroyed by oil, or the fumes of tobacco; and the material may be rendered nauseous to them, and thus escape their ravage by having intermixed with them fragments of Russia leather or other skins, that emit and retain a strong animal odour; and it is probably on this account, though the odour is far less powerful, that this insect never commits its depredations on wool while on the back of the sheep.

8. P. pentadactyla. Body and wings snowy; upper pair bifid, lower ones three-parted. A very beautiful European species, a native of our own country and of other parts of Europe; size minute; the wing divided apparently into plumes, the upper by a delicate midrif consisting of two, the lower of three, with innumerable lateral fibres. The larve is sixteen-footed, hairy, green, with black dots, and a white dorsal line; pupe hairy-green, dotted with black. This insect belongs to the division pterophorus, which constitutes a part of the alucita of Gmelin.

9. P. hexadactyla. Wings cleft, cinereous, spotted with brown, all of them six-parted. This also belongs to the division pterophorus: it inhabits England, and Europe generally, and is found on the loriscera xylosteum, or honey-suckle; and is likewise a most elegant and beautiful insect. It often appears before our windows, and flies in, when they are open, in a still and warm evening in September. See Nat. Hist. Pl. CLXVI.

PHALANGES, in mastiology. See DIDELPHIS.

PHALANGIUM, in zoology, a genus of the class insecta, order aptera. Mouth with horny mandibles, the second joint with a very sharp, moveable, cheliferous tooth; feelers filiform; antennaless; eyes two on the crown and two at the sides; legs eight; abdomen generally rounded. These, in their various stages of transformation, prey on the smaller insects and worms: the larve and pupe are active, eight-footed, and resemble the perfect insect. Nineteen species, thus subdivided:

A. Mouth with a conic tubular sucker.

α Feelers four, the upper one chelate. This tribe constitutes the nymphion of Fabricius.

β Feelers two. The pycnogonum of Fabricius.

B. Mouth without a sucker.

α Feelers projecting, incurved. The phalangium of Fabricius.

β Feelers thick, spinous, and furnished with a claw at the tip.

The general form of this family of insects resembles that of the crab. Like the crab race, too, some of the species are terrestrial, and some aquatic, and they have all a wonderful power of shaking off a limb when entangled, and the whole animal is in danger. The following are chiefly worth notice.

1. P. grossipes. Body minute, cylindrical, glabrous; shoulders tuberculate; legs very long; body dirty-red, very minute and slow. Inhabits European seas; and insinuates itself into the shells of muscles, and destroys the fish.

2. P. opilio. Long-legged spider. Shepherd spider. Harvest spider. Abdomen ovate-grey, beneath whitish. Inhabits Europe and America, and wanders about by night; and is said by some naturalists, but perhaps erroneously, to be the insect that produces many of those gossamer threads with which the grass, stubble, and ground, are so thickly covered in the course of a single night in the autumn. The legs are uncommonly long and slender: when caught by one of them, the insect parts with it to save his body, and makes off without any apparent uneasiness; a faculty in which, as we have already observed, it resembles the crab and lobster, whose loss is quickly repaired by the growth of a new limb. No experiments, however, have yet ascertained whether the power of reproducing their limbs belong also to the insects of this genus.

3. P. arenoides. Chelæ or claws toothed, villous; body oblong, soft, livid, woolly, with [illegible]ated claws. Inhabits the Cape of Good [Ho]pe, and the southern parts of Russia. Its bite is extremely poisonous, occasioning livid tumours, and sometimes death.

4. P. cancroides. Abdomen obovate, depressed, ferruginous; chelæ or claws oblong, hairy. Inhabits Europe in cellars and other damp places; and is the little insect that gets into our legs and under the skin in the summer season, causing a painful itching.

There is another variety with ovate chelæ, the scorpio cimicoides of Fabricius.

5. P. acaroides. Abdomen cylindrical, yellowish; chelæ ovate, smooth. Inhabits Ame-

rica: twice as large as P. cancroides: and its bite said to be extremely painful and dangerous. See Nat. Hist. Pl. CLXIII.

PHALANGOSIS, in surgery, is a tumor and relaxation of the eye-lids, often so great as to deform the eye, and considerably to impede vision. Sometimes the eye-lid when in this state subsides or sinks down, occasioned perhaps either by a palsy of the muscle which sustains and elevates the eye-lid, or else from a relaxation of the cutis above, from various causes. Sometimes an œdematous or aqueous tumor is formed on the eye-lids, so as almost entirely to exclude vision.

PHALANX, in Grecian antiquity, a square battalion, consisting of 8000 men, with their shields joined, and pikes crossing each other, so that it was next to impossible to break it.

Hence phalanx is now often used to denote a troop of men closely embodied

PHALANX is employed by anatomists to the three rows of small bones which form the fingers. See ANATOMY, FINGERS, &c.

PHALARIS, a cruel tyrant of Agrigentum. Perillus made him a brazen bull, and when he had presented it to Phalaris, the tyrant ordered the inventor to be seized, and the first experiment to be made on his body. These cruelties did not long remain unrevenged; the people of Agrigentum revolted in the tenth year of his reign, and put him to death in the same manner as he had tortured Perillus, and many of his subjects. (*Ovid. Juv.*)

PHALARIS. Canary grass. In botany, a genus of the class triandria, order digynia. Calyx two-valved, one-flowered; carinate equal, longer than the corol. Eleven species: natives of India, the Cape, and south of Europe; three of them are common to our own road-sides or sandy fields. Of these P. canariensis is cultivated for the sake of its seeds, which are found to be the best food for canary and other small birds. It is found wild on our road-sides, with panicle awnless, ovate, spikeform; glumes of the calyx boat-shaped, entire: corol four-valved; the outer valves lanceolate, glabrous; inner villous.

PHALAROPE, in ornithology. See TRINGA.

PHALEUCIAN VERSE, in ancient poetry, a kind of verse which consists of five feet, the first of which is a spondee, the second a dactyl, and the three last trochees: such is the following one of Martial:

1 2 3 4 5
Summam | nec metu | as di | em, nec | optes.

PHALLICA, festivals observed by the Egyptians in honour of Osiris. They receive their name from φαλλος, *simulacrum ligneum membri virilis*. The institution originated in this: after the murder of Osiris, Isis, unable to recover the privities of her husband (see OSIRIS,) distinguished that which was lost with more honour than the parts recovered. Its representation, called phallus, was made of wood, and carried during the sacred festivals instituted in honour of Osiris. The people looked upon it as the emblem of fecundity, and the mention of it among the ancients, it is said, though not very truly, we apprehend, never conveyed any impure thought or lascivious reflection. The festivals of the phallus were imitated by the Greeks, and introduced in Europe by the Athenians, who made the procession of the phallus part of the celebration of the Dionysia of the god of wine.

PHALLUS. Morel. In botany, a genus of the class cryptogamia, order fungi. Fungus reticulate above, even beneath; seeds in the reticulations.

Nine species, of which the three following are common to our own country.

1. P. esculentus. Esculent morel. Ovate, cellular, attached at the margin: plaits undulate, anastomosing. This species is found in woods, meadows, and pastures. The substance, when recent, is wax-like and friable, of a whitish-yellow colour, changing to brownish as it decays: the height of the entire fungus being four or five inches. The stalk is thick and clumsy, somewhat tuberous at the base and hollow in the middle. The pileus is either round or conical: at a medium about the size of an egg, often much larger; hollow within; its base united to the stalk, and its surface cellular or latticed with irregular sinuses. The seeds, when magnified, are oval. It is in great esteem, both recent and dried, as an ingredient to heighten the flavour of ragouts. Gleditch asserts that being observed to grow in abundance in the woods in Germany where charcoal has been made, the women who gather them for sale have long been accustomed to make fires in different parts of such woods, with heath, broom, vaccinium, and other materials, in order to obtain a more plentiful crop. From this practice, however, woods have often been set on fire to a considerable extent, and accompanied with great danger; in consequence of which the practice has of late been prohibited.

2. P. impudicus. Stinking morel. Stinkhorns. Found in woods and on banks. It arises from the earth under a veil or volva, shaped exactly like a hen's egg, of the same colour, having a long fibrous radicle at its base. As the volva grows it bursts suddenly into several lacerated, permanent segments, from the centre of which arises an erect, white, cellular, hollow stalk, about five or six inches high, and one thick, of a wax-like friable substance, and most fetid cadaverous smell, conical at each end, the base inserted in a white, concave, membranaceous, turbinated cup, and the summit cupped with a hollow conic pileus. As soon as the volva bursts the plant begins to diffuse its intolerable stench, which is so powerful and widely expanded that the fungus may be discovered by the scent alone, long before it appears to the sight.

3. P. caninus. Dog-morel. Of an ovate form, with undulate plaits or segments, anastomosing with each other. Found also in woods and wild banks.

PHALLUS, in antiquity. See PHALLICI.

• PHANATIC. See FAN.

PHANATIC, or FANATIC, a visionary; one who fancies he sees spectres, spirits, apparitions, or other imaginary objects, even when awake; and takes them to be real. Such are phrenetics, necromancers, hypochondriac persons, lycanthropi, &c. See PHRENETIC, HYPOCHONDRIAC, LYCANTHROPI. Hence the word is also applied to enthusiasts, pretenders to revelation, new lights, prophecies, &c.

PHANTASIA, a daughter of Nicarchus, of Memphis, in Egypt, supposed to have written a poem on the Trojan war, and another on the return of Ulysses to Ithaca, from which compositions Homer copied the greatest part of his Iliad and Odyssey, when he visited Memphis.

PHANTA'SM. PHANTA'SMA. *s.* (φαντασμα, φαντασια, *phantasme, phantasie*, Fr.) Vain and airy appearance; something appearing only to imagination (*Raleigh*).

PHANTASMAGORIA, an appellation lately given to an exhibition of curious optical illusions in London. Though it will be difficult, we apprehend, to prove any exclusive property in phænomena that every experimental philosopher must have practised on a smaller scale, this has been the subject of a patent granted to Mr. Philipsthall, of the Lyceum, in the Strand, who describes his method of representing, in a dark space or scene, human figures, in various characters, proportions, and sizes.

"The apparatus of some of these exhibitions," says he, "consists of two concave glasses, or rather two concave metal reflectors, before which an artificial light, proportionable to their focus, is applied.

"These enlightened concave metal reflectors are secured in a closet or box proportionable to their size, and their requisite light, in such a manner that all the rays of light are directed upon a transparent picture, representing the apparition; which picture reflects, by means of lenses, upon a transparent body, and giving the necessary direction to this apparatus, according to the nature of its circumstances, in such a manner that the apparitions represent themselves to the eye of the spectator arbitrarily, either in a larger or smaller, in a nearer or more distant perspective point of view.

"In the same manner I can likewise represent landscapes and buildings in a very striking and deceiving manner, in a voluntary size.

"Another sort of apparition is produced by the refraction of light, by means of transparent bodies, of various shapes and sizes, which are fixed in a dark closet as aforesaid, and, by means of the refraction of an artificial light, are either made visible or invisible. If those bodies are made to liken deceased persons which are required to be seen, then the apparition is the more striking, and answers fully the ideas commonly formed of a spectre.

"A third sort of these optical deceptions I produce in the following manner, viz. By opaque moveable figures of various sizes and shapes. These are moderately enlightened by the refraction of a concave metal reflector, fixed in a dark closet; but the rays of light must be properly distributed by the refraction of a lens, of a proportionable focus, in order that the enlightened object may alone represent itself to the eye; if therefore, according to the description, the enlightened figures imitate mechanically the motions of men, and appear in proper dress or draperies, then this becomes the most striking illusion, as one may by this regulation, by giving an easy motion to their drapery, produce various groups, and pantomime scenes, out of the world of spirits.

"A fourth sort of optical illusion is operated in the following manner, in order to produce a multiplicity of apparitions. There is between the transparent body upon which the figures reflect, another dark body slipped in, upon which a fixed number of figures are applied, and are distributed in a symmetrical manner; upon these figures either a greater or less light is directed, according to the disposition of the groups, and gives to the apparatus the necessary direction, in order that those which reflect upon the transparent bodies may move through one another, and form all manner of groups; the positions of which are very comic and striking, and they procure the most agreeable entertainment." (Rep. Arts. No. 95.)

This specification, which, it must be confessed, is far from perspicuous, ought to have told, that the phantasmagoria consist of a striking application of the magic lantern. The novelty consists in placing the lantern on the opposite side of the screen which receives the images, instead of on the same side as the spectator, and suffering no light to appear, but what passes through and tends to form those images. Mr. P.'s sliders are therefore perfectly opaque, except that portion upon which the transparent figures are drawn, and the exhibition, as Mr. Nicholson informs us, is thus conducted.

All the lights of the small theatre of exhibition were removed, except one hanging lamp, which could be drawn up so that its flame should be perfectly enveloped in a cylindrical chimney, or opaque shade. In this gloomy and wavering light the curtain was drawn up, and presented to the spectator a cave or place exhibiting skeletons, and other figures of terror, in relief, and painted on the sides or walls. After a short interval the lamp was drawn up, and the audience were in total darkness, succeeded by thunder and lightning; which last appearance was formed by the magic lanthorn upon a thin cloth or screen, let down after the disappearance of the light, and consequently unknown to most of the spectators. These appearances were followed by figures of departed men, ghosts, skeletons, transmutations, &c. produced on the screen by the magic lanthorn on the other side, and moving their eyes, mouth, &c. by the well known contrivance of two or more sliders. The transformations are effected by moving the adjusting tube of the lanthorn out of its focus, and changing the

slider during the moment of the confused appearance.

It must be again remarked, that these figures appear without any surrounding circle of illumination, and that the spectators, having no previous view or knowledge of the screen, nor any visible object of comparison, are each left to imagine the distance according to their respective fancy. After a very short time of exhibiting the first figure, it was seen to contract gradually in all its dimensions, until it became extremely small and then vanished. This effect, as may easily be imagined, is produced by bringing the lanthorn nearer and nearer the screen, taking care at the same time to preserve the distinctness, and at last closing the aperture altogether: and the process being (except as to brightness) exactly the same as happens when visible objects become more remote, the mind is irresistibly led to consider the figures as if they were receding to an immense distance.

Several figures of celebrated men were thus exhibited with some transformations; such as the head of Dr. Franklin being converted into a skull, and these were succeeded by phantoms, skeletons, and various terrific figures, which instead of seeming to recede and then vanish, were (by enlargement) made suddenly to advance, to the surprise and astonishment of the audience, and then disappear by seeming to sink into the ground.

For another description of these interesting illusions, see the notes to Gregory's Translation of Haüy's Philosophy, vol. ii. page 390.

PHANTASTICAL. See FANTASTICAL.

PHANTACY. See FANCY.

PHA'NTOM. *s.* (*phantome*, Fr.) 1. A spectre; an apparition (*Atterbury*). 2. A fancied vision (*Rogers*).

PHAON, a boatman of Mitylene in Lesbos. He received a small box of ointment from Venus, with which, as soon as he rubbed himself, he became one of the most beautiful men of his age. Many were captivated with Phaon, and among others, Sappho, the celebrated poetess. Phaon gave himself up to Sappho's company, but however, he soon conceived a disdain for her, and Sappho, mortified at his coldness, threw herself into the sea.

PHARAMOND is the name which is given by the generality of historians to the first king of France. He is said to have reigned at Treves, and over a part of France, about the year 420; and to have been succeeded by his son Clodion: but the account which is given of these two princes is very uncertain. He is said to be the author of the famous Salique law, which forbad the succession of females.

PHARAOH, a common name of the kings of Egypt. Of these ten at least are mentioned in the Hebrew Scriptures.

PHARAON is the name of a game of chance, the principal rules of which are: The banker holds a pack consisting of 52 cards; he draws all the cards one after the other, and lays them down alternately at his right and left hand; then the ponte may at his pleasure set one or more stakes upon one or more cards, either before the banker has begun to draw the cards, or after he has drawn any number of couples. The banker wins the stake of the ponte when the card of the ponte comes out in an odd place on his right hand, but loses as much to the ponte when it comes out in an even place on his left hand. The banker wins half the ponte's stake when it happens to be twice in one couple. When the card of the ponte, being but once in the stock, happens to be the last, the ponte neither wins nor loses; and the card of the ponte being but twice in the stock, and the last couple containing his card twice, he then loses his whole stake. De Moivre has shown how to find the gain of the banker in any circumstance of cards remaining in the stock, and of the number of times that the ponte's card is contained in it. Of this problem he enumerates four cases, viz. when the ponte's card is once, twice, three, or four times in the stock. In the first case, the gain of the banker is $\frac{1}{n}$, n being the number of cards in the stock. In the second case, his gain is $\frac{(n-2)\times y}{n(n-1)} + \frac{2}{n\times(n-1)}$, or $\frac{\frac{1}{2}n+1}{n\times(n-1)}$ supposing $y=\frac{1}{2}$. In the third case, his gain is $\frac{3y}{2\times(n-1)}$, or $\frac{3}{n\times(n-1)}$, supposing $y=\frac{1}{2}$. In the fourth case, the gain of the banker, or the loss of the ponte, is $\frac{2n-5}{(n-1)\times(n-3)}y$, or $\frac{2n-5}{2\times(n-1)\times(n-3)}$ supposing $y=\frac{1}{2}$. De Moivre has calculated a table, exhibiting this gain or loss for any particular circumstance of the play; and he observes, that at this play the least disadvantage of the ponte, under the same circumstances of cards remaining in the stock, is when the card of the ponte is but twice in it; the next greater when three times, the next when once, and the greatest when four times. He has also demonstrated, that the whole gain per cent. of the banker upon all the money that is adventured at this game, is 2l. 19s. 10d. See De Moivre's Doctrine of Chances, page 77, &c. p. 105, &c.

PHARISA'ICAL. *a.* (from *pharisee.*) Ritual; externally religious; from the sect of the Pharisees, whose religion consisted almost wholly in ceremonies (*Bacon*).

PHARISEES, a celebrated sect among the ancient Jews; so called, say some, because separated from the rest by the austerity of their life, and by their professing a greater degree of holiness, and a more religious observation of the law.

This is the import of the word [illegible] in the Hebrew, or rather Chaldee tongue; hwence is

formed the Greek Φαρισαιος, and the Latin *Pharisæus*. St. Jerom, and several of the rabbins, maintain this etymology; which is very agreeable to the state and character of the Pharisees; who were not only distinguished from the rest by their manner of life, but by their habit. However, others, with less probability, have derived the name from פרש *exposuit*, because the Pharisees were in the highest reputation for expounding the law.

It is very difficult to fix the precise origin of the Pharisees. The Jesuit Serrarius places their first rise about the time of Esdras; because it was then that the Jews first began to have interpreters of their traditions. Maldonat, on the other hand, will not have this sect to have arisen among the Jews, till a little before the time of Christ. Others, perhaps with more probability, refer the origin of the Pharisees to the time of the Maccabees.

Josephus, who describes their dogmata, says, that they attributed all to destiny, and to God; so, however, as not to deprive man of his free agency; which Sixtus of Sienna thus explains: the Pharisees believed, that all things were done by destiny, i. e. with God's foreknowledge, and in consequence of his immutable decree; the will of man still remaining free and unaffected: *Fato, hoc est, Dei præscientia, & immobili decreto, omnia geri; manente tamen libero humanæ libertatis assensu.*

They owned the immortality of the soul, a resurrection, and a future state; but they admitted, at the same time, as some have supposed, a kind of metempsychosis, or transmigration of souls. They also held the doctrine of angels, and separate human spirits.

PHARMACA, among the ancients, meant medicated or enchanted compositions of herbs, minerals, &c. some of which, when taken inwardly, were supposed to cause blindness, madness, love, &c. others infected by touch; such was the garment sent by Medea to Creusa, prepared *secundum artem*; and others operated upon persons at a distance.

PHARMACE'UTICAL. PHARMACE'UTIC. *a.* (Φαρμακευτικος, from φαρμακευω) Relating to the knowledge or art of pharmacy, and preparation of medicines.

PHARMACI, in antiquity, were two persons who were employed in the illustration or purification of cities.

•PHARMACOLITE. *Chaux arseniatée.* Haüy. A mineral of a snow-white colour; occurring in small crystals occasionally prismatic, but more commonly circular; sometimes the crystals are aggregated into bundles, and sometimes into masses of other forms. Internally it is glistening with a silky lustre: its fracture is radiated or divergingly fibrous; it also presents large and small granular distinct concretions. The crystallized varieties are translucent. It is very tender, and easily frangible.

It is soluble in nitric acid without effervescence. By the action of the blow-pipe it disengages an arsenical odour, and leaves an involatilizable residue.

By the experiments of M. Selb, it was first ascertained to be a compound of lime and arsenic acid with a little cobalt: a result which has been fully confirmed by a complete analysis of it by Klaproth.

One hundred grains of this mineral, according to the celebrated chemist last mentioned, lose, by being moderately heated, and without the disengagement of any arsenical or other odour, or visible vapour, 22.5 grains which are water of crystallization. The residue by digestion in nitric acid is dissolved, except six grains which are a mixture of silex and alumine. The nitrous solution affords with acetite of lead a copious precipitate of arseniat of lead which, when washed and dried, weighed 138 grains, and indicated 46.5 of arsenic acid. The remaining fluid, with the washings, was moderately evaporated and treated with a little muriatic acid, to separate the small portion of acetited lead which it contained, and was then mixed with sulphuric acid. This produced a large deposit of sulphat of lime, which after being washed with dilute spirit of wine and heated to redness, weighed 54 grains, and therefore contained 23 grains of lime. The residual liquor being neutralized by carbonated soda, and evaporated to dryness, was dissolved in water, and left behind 0.5 grains of a blue powder, which tinged borax of a deep blue colour, and was oxyd of cobalt. Hence 100 parts of pharmacolite contain

46.5	Arsenic acid,
23.	Lime,
0.5	Oxyd of cobalt,
6.	Silex with alumine,
22 5	Water.
98.5	

of these the first three ingredients appear to be the only ones necessary to the constitution of this mineral.

It has been found near Withchen in Swabia in a vein of granite, accompanied by heavy spar and gypsum. It has also been met with at St. Marieaux mines in France.

PHARMACO'LOGIST. *s.* (φαρμακον and λεγω.) One who writes upon drugs (*Woodward*).

PHARMACO'LOGY. *s.* (φαρμακον and λεγω.) The knowledge of drugs and medicines.

PHARMACOPŒIA. (φαρμακοποια from φαρμακον, a medicine, and ποιεω, to make.) A dispensatory; or compilation of medical materials. The term has of late years, however, been confined almost entirely to a dispensatory published by authority; almost every government in Europe having been long aware of the expediency, and indeed necessity, of having some regular standard by which to regulate officinal compositions and preparations. The first work of this kind published by authority appears to have been the dispensatory of Valerius Cordus, introduced to the world in 1542, under the sanction of the senate of Nuremberg. It is for the most part a compilation

rom Mesue and Nicholas of Salerno; and retains some degree of celebrity even in the present day, from Hoffman's numerous references to it. The Pharmacopœia Bergamensis followed it in 1581, under the authority of the senate of Bergamo: and to this succeeded the Augustan pharmacopœia, first published at Augsburg in 1601, and afterwards at Rotterdam in 1653, with many valuable notes by Zwelfer. The former of these two editions may be esteemed the basis of the best pharmacopœias of modern times; the earliest of the London college, published in 16'8, and of the Paris school, published in 1037, are distinctly founded upon it. Since this period pharmacopœias of authorised form have become so numerous, that it would be tedious and useless to run over even a muster roll. We shall only, therefore, observe upon them generally, that the three colleges of London, Edinburgh, and Dublin have now pharmacopœias of great value and genuine science: all of them published since the beginning of 1803, and the last edition of the London as recently as 1809.

Concerning this last, therefore, which ought to be regarded as the most complete of the whole, it may be expected that we should offer a few particulars. A period of twenty-two years had existed since the publication of the preceding edition; and hence it may well be expected that many preparations and terms but ill accorded with the actual state of the medical art, and more especially with the actual state of chemistry and natural history.

In the general arrangement some alteration has been made, and a greater degree of simplicity hereby obtained: but we discover no aim at any thing like scientific grouping, although without such an endeavour a common alphabetic succession might have answered as well as any other. Hence, while some of the metallic preparations are given under the heads of the substances to which they belong simply and chemically, others are given under the heads of the mere colours they produce when dissolved in spirits of wine; and the different preparations of the same substances are thus perpetually separated at a wide distance from each other. These disjunctions of different forms of the same substance are very numerous, and in various instances very incondite. The nomenclature is considerably improved upon the whole; it is in some instances, as in the case of anthemis and cusparia, pressed a little too far, and perhaps in the case of potassa and soda, which are now universally acknowledged to be oxyds of metals, not quite pressed far enough. The college, in an elegant Latin preface, complains of the horrid barbarity of the first of these words; and it might have complained equally of the second, although not quite so disgusting in pronunciation: but it should not only have complained, it should have corrected; there was no necessity for either of these terms, at least in a medical contemplation of the science. Cetaceum is elegantly adopted for sperma ceti; octarius is perhaps preferable to congius, though the alteration was hardly called for; fluidunica and fluidrachma are rather fitted for the meridian of Germany than of England; but minimum is certainly a better term, and subject to better regulations than gutta.

The preparations and compounds are exhibited under the following heads:

Acida	Spiritus
Alkalia et eorum Sales	Tincturæ
	Ætherea
Terræ et eorum Sales	Vina
	Acetica
Sulphurea	Mellita
Metalla et eorum Sales	Syrupi
	Confectiones
Vegetabilia	Pulveres
Olea Expressa	Pilulæ
Olea Distillata	Præparata ex Animalitus
Aquæ Distillatæ	
Decocta	Emplastra
Infusa	Cerata
Mucilagines	Unguenta
Extracta	Linimenta
Misturæ	Cataplasm

Upon these divisions the limits to which we are confined prevent us from making more than a few observations.

Among the acids we perceive a form for the citric, now first introduced into the list, which will be found a useful and elegant medicine; we have a new form for the nitric, and the flores benzoës assume the name of acidum benzoicum.

In the alkalines we meet with no great difference, except in the chance of names, which, for the most part, are shortened from those of the Edinburgh Pharmacopœia.

The same general observation may apply to the earths and salts, which, under the existing Pharmacopœia, form one common chapter with the two preceding divisions. The chapter sales employs the term soda instead of that of natron.

The sulphurea of the new Pharmacopœia is nearly a transcript of the preparata e sulphure of that hitherto in use.

Among the metallica we perceive the pulvis antimonialis ordered to be prepared with half the quantity of sulphurated antimony to that of gross antimony, as under the late form. A useful and well-known preparation of arsenic is introduced under the name of liquor arsenicalis. Copper furnishes two preparations, cuprum ammoniatum and liquor cupri ammoniati; and iron several additional forms.

Among the distilled waters, the aqua anethi is banished, and the aqua carui introduced in its stead.

The addition to the chapter of decoctions is numerous, and consists chiefly in a form of this kind for the dulcamara, lichen, senega, and veratrum.

To the infusions there is also a very numerous addition: angustura, cloves, cascarilla, cinchona, columbo, quassia, rhubarb, simarouba, tobacco, digitalis, horse-radish, each be-

comes a separate subject of this mode of preparation.

Among the mucilages, that of tragacanth is omitted.

The extracts afford us new preparations in the hop (humulus lupulus), poppy, sarsaparilla, dandelion (taraxacum), and hemlock.

The mixtures give us a new form for gum guaiacum.

The spirits revive the old spiritus anisi, and spiritus raphani, the latter under the newer name of spiritus armoraciæ compositus.

The chapter of tinctures provides a new form for capsicum, digitalis, humulus, hyoscyamus, kino.

The aceta give us a form for the colchicum.

The syrupi provide a form for the lemon, and order the syrupus papaveris somniferi to be prepared from its extract.

The term confectiones is intended to embrace equally electuaries, confections, and conserves: from this chapter several of the existing forms are banished.

The list of pulveres is also considerably diminished, chiefly by a rejection of several of the cretaceous preparations.

Among the pilulæ we now meet with a gamboge pill; the opium pill is banished.

The list of emplastra is diminished in a few forms, and enriched by about an equal number.

The cerata are increased by a ceratum sabinæ and C. lyttæ.

The unguenta are much diminished; several of those, indeed, in the existing Pharmacopœia being transferred under a different preparation to the chapter of cerata: while as new articles we have an U. hydrargyri nitrici, U. hydrargyri nitrico-oxydati, and U. veratri.

The liniments give us as a new preparation, a lin. æruginis.

The cataplasms offer us a new form for one prepared from meal and yeast, under the title of C. fermenti.

PHARMACO'POLIST. *s.* (φαρμακον and πωλεω.) An apothecary; one who sells medicines.

PHARMACY. The genuine science of therapeutics may be divided into three parts: medicinal materials, the preparation of those materials, and the diseases in which they are employed. Pharmacy includes the second of these divisions; and is, hence, the doctrine of preserving, arranging, compounding, and intermixing the different articles of the *materia medica*, so that as simple substances we may obtain their virtues in the most active or most convenient form, and, in a state of combination, redouble or vary their powers according to the intention we have in view. In prosecuting this subject a multiplicity of operations are necessary, some of them mechanical, some chemical, which constitute the means by which the result is to be attained; and under this natural division the means and the end, pharmaceutical operations, and pharmaceutical preparations, we shall consider the subject before us: availing ourselves to a considerable extent of an article upon the same subject furnished by the editor of this department of the PANTOLOGIA to another respectable dictionary of arts and sciences a few years ago, but availing ourselves of the various important discoveries which have since taken place in several branches of chemistry, so far as they are connected with the present subject, and re-modelling it as far as is necessary in reference to the new Pharmacopœia of the London college, which had not then made its appearance.

PART I.—PHARMACEUTICAL OPERATIONS.

Under this head we shall comprise the mode of collecting and preserving medicinal simples: the mechanical instruments employed, and the changes they introduce: chemical instruments and apparatus, their use, application, and power.

Collection and Preservation of Simples.

Each of the kingdoms of nature furnishes articles employed in medicine in their natural state, or when prepared by pharmacy; and in collecting these our first attention should be to make choice of sound and perfect substances; to throw off whatever is injured or decayed, and to separate them from all adventitious matters. As a general rule, they must be defended from the effects of moisture, great heat, cold, and freely exposed to the air. Yet where their activity and virtue depend on volatile principles, instead of being freely exposed to the air, they must be confined, as much as possible, from its contact.

The vegetable kingdom affords us the most numerous articles; these should rather be obtained from countries in which they grow naturally than countries in which they merely grow by transplantation; and those which grow wild, in dry soils, and exposed situations fully open to the air and the sun, are for the most part to be preferred to plants that are cultivated, or that grow in moist, low, shady, and confined situations. Annual roots should be collected before they shoot forth their stalks or flowers; biennial roots in the harvest of their first year, or the spring time of their second; perennial roots either in the spring time before the sap has begun to mount, or in harvest after it has returned. Worm-eaten or decayed roots, except in a few cases of resinous plants, are to be rejected; the rest are to be cleaned immediately with a brush and cold water; immersing them in the water as short a time as possible, and cutting off the radicles and fibres when not essential. Roots which consist chiefly of fibres, and have but a small sap, may be dried at once; if juicy and not aromatic, in a heat somewhat below 100° of Fahrenheit; but if aromatic, by simply exposing them to a current of cold dry air, and frequently turning them in it. If very thick and strong, they must be split and cut into slices and strung upon threads; if covered with a tough bark, they may be peeled and dried while fresh. Such as lose their virtues by drying are to be kept buried in dry sand.

It is difficult to lay down general rules for collecting stalks and leaves, some of which acquire, while others lose, their activity by age. Aromatics should be collected after the flower-buds are formed; non-aromatics, if annuals, when in flower or about to flower, biennials before they shoot; and perennials before they flower, especially the woody-fibred. They should be gathered in dry weather, after the morning dew is off, or before it falls in the evening. Generally speaking, they should be tied in bundles, and hung up in a shady, warm, and airy place, or spread upon the floor, and frequently turned. If very juicy, they are to be laid upon a sieve, and dried by a gentle degree of artificial warmth. Sprouts are to be collected before the buds open, and stalks to be gathered in autumn. Barks are to be collected when the most

active part of the vegetables are concentrated in them. Spring is preferred for resinous barks, and autumn for the others which are rather gummy than resinous. Young trees afford the best bark for medical purposes.

The same rules direct the collection of woods; but they must not be taken from very young trees. Among the resinous woods, the heaviest, which sink in water, are selected. The alburnum is to be rejected.

Flowers are collected in clear dry weather, before noon, but after the dew is off: either when they are just about to open, or immediately after they have opened. Of some the petals only are preserved, and the colourless claws are even cut away; of others whose calyx is odorous, the whole flower is kept. Flowers which are too small to be pulled singly, are dried with part of the stalk: these are called heads or tops.

Flowers are to be dried nearly as leaves, but more quickly, and with more attention. As they must not be exposed to the sun, it is best done by a slight degree of artificial warmth. When they lose their colour and smell they are unfit for use.

Seeds and fruits, unless when otherwise directed, are to be gathered when ripe, but before they fall spontaneously. Some pulpy fruits are freed from their core and seeds, strung upon thread, and dried artificially. They are in general best preserved in their natural coverings, although some, as the colocynth, are peeled, and others, as the tamarind, preserved fresh. Many of these are apt to spoil, or become rancid; and as they are then no longer fit for medical use, no very large quantity of them should be collected at a time.

The proper drying of vegetable substances is of the greatest importance. This is often directed to be done in the shade, and slowly, that the volatile and active particles may not be dissipated by too great heat; but this is an error, for they always lose infinitely more by slow than by quick drying. When, on account of the colour, they cannot be exposed to the sun, and the warmth of the atmosphere is insufficient, they should be dried by an artificial warmth, less than 100° Fahrenheit, and well exposed to a current of air. When perfectly dry and friable, they have little smell; but after being kept some time, they attract moisture from the air, and regain their proper odour.

The boxes and drawers in which vegetable matters are kept, should not impart to them any smell or taste; and more certainly to avoid this, they should be lined with paper. Such as are volatile, of a delicate texture, or subject to suffer from insects, must be kept in well covered glasses. Fruits and oily seeds, which are apt to become rancid, must be kept in a cool, and dry, but by no means in a warm or moist place.

Oily seeds, odorous plants, and those containing volatile principles, must be collected fresh every year. Others, whose properties are more permanent, and not subject to decay, will keep for several years. Vegetables collected in a moist and rainy season are in general more watery and apt to spoil. In a dry season, on the contrary, they contain more oily and resinous particles, and preserve much better.

Mechanical Operations.

These consist of the mode of determining the weight or measure of bodies; their division into minute particles; their separation of part from part, or of the useful from the useless; the modes of intermixing them.

Weights and Measures.—The quantities of substances employed as medicines are determined with the greatest accuracy by weighing. The scales should balance with the utmost precision, and turn with the utmost facility. Balances should be defended as much as possible from acid and other corrosive vapours, and not be unnecessarily suspended, as their delicacy of decision is hereby much impaired; and to guard against this last evil in another way, they should never be overloaded.

The want of an uniformity of weights and measures which is felt in every country, and in every branch of trade and commerce, is of peculiar inconvenience in pharmacy. All our college pharmacopœias command the use of troy weight; yet the wholesale druggists in every instance, excepting where a very small portion of an article is bought by grains, simples, or drams, sell by avoirdupois weight; and there is reason to fear that, both amongst apothecaries and druggists, most of the pharmaceutic compositions are prepared by this last division; in consequence of which it is impossible for the physician to know the exact strength of the dose he prescribes: and if he do, he cannot often obtain it in the proper proportions of its respective ingredients. The difficulty is still increased by a promiscuous use of weights and measures, in determining the quantities of fluids; on which account, though the London college still authorises both for distinct purposes, the colleges of Edinburgh and Dublin have rejected measures altogether.

For measuring fluids, the graduated glass measures are always to be preferred, they should be of different sizes, according to the quantities they are intended to measure. Elastic fluids are also measured in glass tubes, graduated by inches and their decimals.

Specific gravity is the weight of a determinate bulk of any body. For a standard of comparison, distilled water has been assumed as unity. The specific gravity of solids is ascertained, by comparing the weight of the body in the air with its weight when suspended in water. The quotient obtained by dividing its weight in air, by the difference between its weight in air and its weight in water, is its specific gravity. The specific gravity of fluids may be ascertained by comparing the loss of weight of a solid body, such as a piece of crystal, when immersed in distilled water, with its loss when immersed in the fluid we wish to examine; by dividing its loss of weight in the fluid by its loss of weight in the water, the quotient is the specific gravity of the fluid: or a small phial, containing a known weight of distilled water, may be filled with the fluid to be examined and weighed, and by dividing the weight of the fluid by the weight of the water, the specific gravity is ascertained.

Although these are the only general principles by which specific gravities are ascertained, yet as the result is always influenced by the state of the thermometer and barometer at the time of the experiments, and as the manipulation is a work of great nicety, various ingenious instruments have been contrived to render the process and calculation easy. Of all these, the gravimeter of Morveau seems to deserve the preference.

It would be of material consequence to science and the arts, if specific gravities were always indicated by the numerical term expressing their relation to the specific gravity of distilled water. This however is unfortunately not the case. The excise-officers in this country collect the duties paid by spirituous liquors, by estimating the proportion which they contain of a standard spirit, about 0.933

in specific gravity, which they call hydrometer proof, and they express the relation which spirits of a different strength have to the standard spirit by saying that they are above or under hydrometer proof. Thus one to six, or one in seven below hydrometer proof means that it is equal in strength to a mixture of six parts of proof spirit with one of water.

The only other mode of expressing specific gravities, which it is necessary to notice, is that of Baumé's aerometer, as it is often used in the writings of the French chemists, and is little understood in this country. For substances heavier than water he assumes the specific gravity of distilled water as zero, and graduates the stem of his instrument downwards, each degree being supposed by him to express the number of parts of muriat of soda contained in a given solution, which however is not at all the case. For substances lighter than water the tube is graduated upwards, and this zero is afforded by a solution of 10 of salt in 90 water.

Mechanical division.—By this process substances are reduced to a form better adapted for medical purposes; and by the increase of their surface, their action is promoted, both as medical and chemical agents. It is performed by cutting, bruising, grinding, grating, rasping, filing, pulverization, trituration, and granulation, by means of machinery or of proper instruments.

Pulverization is the first of these operations that is commonly employed in the apothecary's shop. It is performed by means of pestles and mortars. The bottom of the mortars should be concave; and their sides should neither be so inclined as not to allow the substances operated on to fall to the bottom between each stroke of the pestle, nor so perpendicular as to collect it too much together, and to retard the operation. The materials of which the pestles and mortars are formed should resist both the mechanical and chemical action of the substances for which they are used. Wood, iron, marble, siliceous stones, porcelain, and glass. are all employed; but copper, and metals containing copper, are to be avoided. They should be provided with covers, to prevent the finest and lightest parts from escaping, and to defend the operator from the effects of disagreeable or noxious substances. But these ends are more completely attained, by tying a piece of pliable leather round the pestle and round the mouth of the mortar. It must be closely applied, and at the same time so large, as to permit the free motion of the pestle. In some instances, it will be even necessary for the operator to cover his mouth and nostrils with a wet cloth, and to stand with his back to a current of air, that the very acrid particles which arise may be carried from him. The addition of a little water or spirit of wine, or of a few almonds, to very light and dry substances, will prevent their flying off. But almonds are apt to induce rancidity, and powders are always injured by the drying which is necessary when they have been moistened. Water must never be added to substances which absorb it, or are rendered cohesive by it.

All vegetable substances must be previously dried. Resins and gummy resins, which become soft in summer, must be powdered in very cold weather, and must be beaten gently, or they will be converted into a paste instead of being powdered. Wood, roots, barks, horn, bone, ivory, &c. must be previously cut, split, chipped, or rasped. Fibrous woods and roots should be finely shaved after their bark is removed, for otherwise their powders will be full of hair-like filaments, which can scarcely be separated. Some substances will even require to be moistened with mucilage of tragacanth, or of starch, and then dried before they can be powdered. Camphor may be conveniently powdered by the addition of a little spirit of wine, or almond oil. The emulsive seeds cannot be reduced to powder, unless some dry powder be added to them. To aromatic oily substances, sugar is the best addition. All impurities and inert parts having been previously separated, the operation must be continued and repeated upon vegetable substances, till no residuum is left. The powders obtained at different times must then be intimately mixed together, so as to bring the whole to a state of perfect uniformity.

Very hard stony substances must be repeatedly heated to a red heat, and then suddenly quenched in cold water, until they become sufficiently triable. Some metals may be powdered hot in a heated iron mortar, or may be rendered brittle by alloying them with a little mercury.

Trituration is intended for the still more minute division of bodies. It is performed in flat mortars of glass, agate, or other hard materials, by giving a rotatory motion to the pestle; or on a levigating stone, which is generally of porphyry, by means of a muller of the same substance. On large quantities it is performed by rollers of hard stone, turning horizontally upon each other, or by one vertical roller twining on a flat stone.

The substances subjected to this operation are generally previously powdered or ground.

Levigation differs from trituration only in the addition of water or spirit of wine to the powder operated upon, so as to form the whole mass into a kind of paste, which is rubbed until it be of sufficient smoothness or fineness. Earths, and some metallic substances, are levigated.

Granulation is employed for the mechanical division of some metals. It is performed either by stirring the melted metal with an iron rod until it cools, or by pouring it into water, and stirring it continually as before, or by pouring it into a covered box, previously well rubbed with chalk, and shaking it until the metal cools, when the rolling motion will be converted into a rattling one. The adhering chalk is then to be washed away.

Mechanical separation is obtained by sifting, elutriation, decantation, filtration, despumation, expression.

Sifting. From dry substances, which are reduced to the due degree of minuteness, the coarser particles are to be separated by sieves of iron-ware, haircloth or gauze, or by being dusted through bags of fine linen. For very light and valuable powders, or acrid substances, compound sieves, having a close lid and receiver, must be used. The particles which are not of sufficient fineness to pass through the interstices of the sieve may be again powdered.

Elutriation is confined to mineral substances, on which water has no action. It is performed for separating them from foreign particles and impurities, of a different specific gravity, in which case they are said to be washed; or for separating the impalpable powders, obtained by trituration and levigation from the coarser particles. This process depends upon the property that very fine or light powders have of remaining for some time suspended in water; and is performed by diffusing the powder or paste formed by levigation through plenty of water, letting it stand a sufficient time, until the coarser particles settle at the bottom; and then pouring off the liquid in which the finer or lighter particles are suspended. Fresh water may

be poured on the residuum, and the operation repeated; or the coarser particles, which fall to the bottom, may be previously levigated a second time.

Decantation. The fine powder which is washed over with the water is separated from it, by allowing it to subside completely, and by either decanting off the water very carefully, or by drawing it off by a syringe or syphon. These processes are very frequently made use of for separating fluids from solids which are specifically heavier, especially when the quantity is very large, or the solid so subtile as to pass through the pores of most substances employed for filtration, or the liquid so acrid as to corrode them.

Filtration. For the same purpose of separating fluids from solids, straining and filtration are often used. These differ only in degree, and are employed when the powder either does not subside at all, or too slowly and imperfectly for decantation. The instruments for this purpose are of various materials, and must in no instance be acted upon by the substances for which they are employed. Fats, resins, wax, and oils, are strained through hemp or flax spread evenly over a piece of wire-cloth or net stretched in a frame. For saccharine and mucilaginous liquors, fine flannel may be used; for some saline solutions, linen. Where these are not fine enough, unsized paper is employed, but it is extremely apt to burst by hot watery liquors which dissolve its size; and very acrid liquors, such as acids, are filtered by means of a glass funnel, filled with powdered quartz, a few of the larger pieces being put in the neck, smaller pieces over these, and the finer powder placed over all. The porosity of this last filter retains much of the liquor; but it may be recovered by gently pouring on it as much distilled water; the liquor will then pass through, and the water be retained in its place. Water may be filtered in large quantities through basins of porous stone, or artificial basins of nearly equal parts of fine clay and coarse sand. The size of the filters depends on the quantity of matter to be strained. When large, the flannel or linen is formed into a conical bag, and suspended from a hoop or frame; the paper is either spread on the inside of these bags, or folded into a conical form, and suspended by a funnel. It is of advantage to introduce glass rods or quill barrels between the paper and funnel, to prevent them from adhering too closely. What passes first is seldom fine enough, and must be poured back again, until by the swelling of the fibres of the filter, or filling up of its pores, the fluid acquires the requisite degree of limpidity. The filter is sometimes covered with charcoal powder, which is a useful addition to muddy and deep-coloured liquors. The filtration of some viscid substances is much assisted by heat.

Expression is a species of filtration, assisted by mechanical force. It is principally employed to obtain the juices of fresh vegetables, and the unctuous vegetable oils. It is performed by means of a screw press with plates of wood, iron, or tin. The subject of the operation is previously beaten, ground, or bruised. It is then inclosed in a bag, which must not be too much filled, and introduced between the plates of the press. The bags should be of hair-cloth, or canvass inclosed in hair-cloth. Hempen and woollen bags are apt to give vegetable juices a disagreeable taste. The pressure should be gentle at first, and increased gradually. Vegetables intended for this operation should be perfectly fresh and freed from all impurities. In general they should be expressed as soon as they are bruised, for it disposes them to ferment; but subacid fruits give a larger quantity of juice and of finer quality, when they are allowed to stand some days in a wooden or earthen vessel after they are bruised. To some vegetables which are not juicy enough of themselves, the addition of a little water is necessary. Lemons and oranges must be peeled, as their skins contain a great deal of essential oil, which would mix with the juice. The oil itself may be obtained separately, by expression with the fingers against a plate of glass.

For unctuous seeds iron-plates are used; and it is customary not only to heat the plates, but to warm the bruised seeds in a kettle over the fire, after they have been sprinkled with some water, as by these means the product is increased, and the oil obtained is more limpid. But as their disposition to rancidity is increased by it, if possible this practice should be laid aside, or confined to exposing the bruised seeds, inclosed in a bag, to the steam of hot water.

Despumation is generally practised on thick and clammy liquors, which contain much slimy and other impurities, not easily separable by filtration.

The scum arises either by simply heating the liquor, or by clarifying it, which is done by mixing with the liquor, when cold, whites of eggs well beaten with a little water, which on being heated coagulates, and entangling the impurities of the liquor, rises with them to the surface, and may be easily removed by a perforated ladle. Or the liquor may now be filtered with ease. Spirituous liquors are clarified by means of isinglass dissolved in water, or any albuminous fluid, such as milk, which coagulates by the action of alcohol without the assistance of heat. Some expressed juices, such as those of the antiscorbutic plants, are instantly clarified by the addition of vegetable acid, such as the juice of bitter oranges.

Fluids can only be separated from each other, when they have no tendency to combine, and when they differ in specific gravity. The separation may be effected by skimming off the lighter fluid with a silver or glass spoon; or by drawing it off by a syringe or syphon; or by means of a glass separatory, which is an instrument having a projecting tube, terminating in a very slender point, through which the heavier fluid alone is permitted to run; or by means of the capillary attraction of a spongy woollen thread; for no fluid will enter a substance whose pores are filled by another, for which it has no attraction; and, lastly, upon the same principle, by means of a filter of unsized paper, previously soaked in one of the fluids, which in this way readily passes through it, while the other remains behind.

Mechanical mixture is performed by agitation, trituration, or kneading; but these will be best considered in treating of the forms in which medicines are exhibited.

Chemical Operations and Results.

Under this chapter we have to consider the apparatus employed, the changes produced, and the general analyses that ensue.

The apparatus consists of vessels, fuel, or heat; and the different modes by which such fuel or heat is applied, whether lamps, furnaces, &c.

The vessels must necessarily vary in their form and materials; upon the first of which it will be more convenient to enlarge as we proceed to treat of the particular operations in which they are employed. In choosing the materials for the construction of our vessels, the properties most generally

required are a power of resisting chemical agents, transparency, compactness, strength, fixity and infusibility, and an ability to sustain sudden variations of temperature without breaking.

Generally speaking, metals possess the four last properties in considerable perfection; but they are all opaque. Iron and copper are apt to be corroded by chemical agents; and a solution of the last is often followed by dangerous affections. Tinning them will sometimes, but not always, answer; for tin and lead are often too fusible. Platinum, gold, and silver, resist most of the chemical agents, but are too expensive for general use.

Good earthen ware resists the greatest intensity of heat, but has no other property to recommend it. Clay, the basis of all such wares, is plastic when worked with water, and sufficiently hard when burnt with an intense heat. But intense heat contracts it unduly; and it is apt to split and crack upon exposure to sudden changes of temperature; whence it is necessary to counteract this property by the addition of some other substance. Siliceous sand, clay reduced to powder, and then burnt with a very intense heat, and plumbago, are occasionally used. These additions, however, are attended with other inconveniencies; plumbago especially is liable to combustion, and sand diminishes the compactness; so that when not glazed, they are porous, and when glazed, they are acted upon by chemical agents. The chemical vessels, manufactured by Messrs. Wedgewood, are the best of this description, except porcelain, which is too expensive.

Glass possesses the three first qualities in an eminent degree, and may be heated red hot without melting. Its greatest inconvenience is its disposition to crack or break in pieces when suddenly heated or cooled. As this is occasioned by its unequal expansion or contraction, it is best remedied by forming the vessels very thin, and giving them in general a rounded shape. Glass-vessels should also be well annealed, that is, cooled very slowly, after being blown, by placing them immediately in an oven while they are yet in a soft state. When ill annealed, or cooled suddenly, glass is apt to fly in pieces on the slightest change of temperature, or touch of a sharp point. We may sometimes take advantage of this imperfection; for by means of a red-hot wire, glass-vessels may be cut into any shape. Where there is not a crack already in the glass, the point of the wire is applied near the edge, by which a crack is formed; and this is afterwards easily led in any direction we wish.

Reaumur's porcelain is also glass, which by being surrounded with hot sand, is made to cool so slowly, that it assumes a crystalline texture, that destroys its transparency, but imparts to it every other quality desirable in chemical vessels. The coarser kinds of glass are commonly used in making it; but as there is no manufacture of this valuable substance, its employment is still very limited.

Lutes also form a necessary part of chemical apparatus. They are compositions of various substances, intended to close the joining of vessels, to coat glass vessels, and to line furnaces. Lutes of the first description are commonly employed to confine elastic vapours. They should therefore possess the following properties, viscidity, plasticity, compactness, the power of resisting acrid vapours, and certain degrees of heat. The viscidity of lutes depends on the presence either of unctuous or resinous substances, mucilaginous substances, or clay.

Lutes of the first kind possess viscidity and resist acrid vapours in an eminent degree; but they are in general so fusible that they cannot be employed when they are exposed even to very low degrees of heat, and they will not adhere to any substance that is at all moist. The following are a few of this kind that have been most frequently employed.

Eight parts of yellow wax melted with one of oil of turpentine, with or without the addition of resinous substances, according to the degree of pliability and consistence required. Lavoisier's lute.

Four parts of wax melted with two of varnish and one of olive oil. Saussure's lute.

Three parts of powdered clay worked up into a paste, with one of drying oil, or, what is better, amber varnish. The drying oil is prepared by boiling 22.5 parts of litharge in 16 of linseed oil until it be dissolved. Fat lute.

Chalk and oil, or glazier's-putty, is well fitted for luting tubes permanently into glass vessels, for it becomes so hard that it cannot be easily removed.

Equal parts of litharge, quicklime, and powdered clay, worked into a paste with oil varnish, is sometimes used to daub the cracks in glass vessels, so as to render them again fit for some purposes.

Melted pitch and brick dust.

Mucilaginous substances, such as flour, starch, gum, and glue mixed with water, with or without some powder, are sufficiently adhesive, are dried by moderate degrees of heat, and are easily removed after the operation, by moistening them with water. But a high temperature destroys them, and they do not resist corrosive vapours. Of these take the following forms.

Slips of bladder macerated in water, and applied with the inside next the vessels. They are apt, however, from their great contraction on drying, to break weak vessels.

One part of gum arabic with six or eight of chalk, formed into a paste with water.

Flour worked into a paste with powdered clay or chalk.

Almond or linseed meal formed into a paste with mucilage or water.

Quicklime in fine powder, hastily mixed with white of egg, and instantly applied, sets very quickly, but becomes so hard that it can scarcely be removed.

Slaked lime in fine powder, with glue, does not set so quickly as the former.

The cracks of glass vessels are sometimes mended by daubing them and a suitable piece of linen over with white of egg, strewing both over with finely powdered quicklime, and instantly applying the linen closely and evenly.

Earthy lutes resist very high temperatures, but they become so hard that they can scarcely be removed, and often harden so quickly after they are mixed up, that they must be applied immediately. Examples.

Quicklime well incorporated with a sixth part of muriate of soda.

Burnt gypsum, made up with water.

One ounce of borax dissolved in a pound of boiling water, mixed with a sufficient quantity of powdered clay. Mr. Watt's fire lute.

One part of clay with four of sand formed into a paste with water. This is also used for coating glass vessels, in order to render them stronger and capable of resisting violent degrees of heat. It is then made into a very thin mass, and applied in successive layers, taking care that each coat be perfectly dry before another be laid on.

The lutes for lining furnaces will be described when treating of furnaces.

The junctures of vessels which are to be luted to each other must previously be accurately and firmly fitted, by introducing between them, when necessary, shorts bits of wood or cork, or, if the disproportion be very great, by means of a cork fitted to the one vessel, having a circular hole bored through it, through which the neck of the other vessel or tube passes. After being thus fitted, the lute is either applied very thin, by spreading it on slips of linen or paper, and securing it with thread, or if it is a paste lute, it is formed into small cylinders, which are successively applied to the junctures, taking care that each piece be made to adhere firmly and perfectly close in every part before another is put on. Lastly, the whole is secured by slips of linen or bladder. In many cases, to permit the escape of elastic vapours, a small hole is made through the lute with a pin, or the lute is perforated by a small quill fitted with a stopper.

Heat and Fuel.—As caloric is an agent of the most extensive utility in the chemical operations of pharmacy, it is necessary that we should be acquainted with the means of employing it in the most economical and efficient manner.

The rays of the sun are used in the drying of many vegetable substances, and the only attentions necessary are to expose as large a surface as possible, and to turn them frequently, that every part may be dried alike. They are also sometimes used for promoting spontaneous evaporation.

The combustion of different substances is a much more powerful and certain source of heat. The substances employed for this purpose are either fluid or solid. Alcohol, oil, tallow, wood, turf, coal, charcoal, and coke, are all occasionally employed.

Alcohol, oil, and melted tallow, fluid inflammables, must be burnt on porous wicks. These act merely mechanically, by drawing up a portion of the fluid to be volatilized and inflamed. They are therefore burnt in lamps of various constructions. But although commonly used to produce light, they afford a very uniform, though not very high, temperature. It may however be increased by increasing the number of the wicks and their size. Alcohol produces a steady heat, no soot, and, if strong, leaves no residuum. Oil gives a higher temperature, but on a common wick produces much smoke and soot. These are diminished, and the light and heat increased, by making the surface of the flame bear a large proportion to the centre, which is best done by a cylindrical wick, so contrived that the air has free access both to the outside and to the inside of the cylinder, as in Argand's lamp, invented by Mr. Boulton of Birmingham. In this way oil may be made to produce a considerable temperature of great uniformity, and without the inconvenience of smoke.

Wicks have the inconvenience of being charred by the high temperature to which they are subjected, and of becoming so clogged as to prevent the fluid from rising in them. They must then be trimmed, but this is seldomer necessary with alcohol and fine oils than with the coarser oils. Lamps are also improved by adding a chimney to them. It must admit the free access of air to the flame, and then it increases the current, confines the heat, and steadies the flame. The intensity of the temperature of flame may be increased astonishingly by forcing a small current of hot air through it as by the blow pipe.

Wood, turf, coal, charcoal, and coke, solid combustibles, are burnt in grates and furnaces. Wood has the advantage of kindling readily, but affords a very unsteady temperature, is inconvenient from its flame, smoke, and soot, and requires much attention. The heavy and dense woods give the greatest heat, burn longest, and leave a dense charcoal.

Dry turf gives a steady heat, and does not require so much attention as wood; but it consumes fast, its smoke is copious and penetrating, and the empyreumatic smell which it imparts to every thing it comes in contact with adheres with great obstinacy. The heavy turf of marshes is preferable to the light superficial turf.

Coal is the fuel most commonly used in this country. Its heat is considerable and sufficiently permanent, but it produces much flame and smoke.

Charcoal, especially of the dense woods, is a very convenient and excellent fuel. It burns without flame or smoke, and gives a strong, uniform, and permanent heat, which may be easily regulated, especially when it is not in too large pieces, and is a little damp. But it is costly, and burns quickly.

Coke, or charred coal, possesses similar properties to charcoal; it is less easily kindled, but is capable of producing a higher temperature, and burns more slowly.

When an open grate is used for chemical purposes, it should be provided with cranes to support the vessels operated in, that they may not be overturned by the burning away of the fuel.

Furnaces.—In all these, the principal objects are, to produce a sufficient degree of heat, with little consumption of fuel, and to be able to regulate the degree of heat.

An unnecessary expenditure of fuel is prevented by forming the sides of the furnace of very imperfect conductors of caloric, and by constructing it so that the subject operated on may be exposed to the full action of the fire.

The degree of heat is regulated by the quantity of air which comes in contact with the burning fuel. The quantity of air is in the compound ratio of the size of the aperture through which it enters and its velocity. The velocity is increased by mechanical means, as by bellows, or by increasing the height and width of the chimney.

The size and form of furnaces, and the materials of which they are constructed, are various, according to the purposes for which they are intended.

The essential parts of a furnace are, a body for the fuel to burn in; a grate for it to burn upon; an ash-pit to admit air and receive the ashes; a chimney for carrying off the smoke and vapours.

The ash-pit should be perfectly close, and furnished with a door and register-plate, to regulate the quantity of air admitted.

The bars of the grate should be triangular, and placed with an angle pointed downwards, and not above half an inch distant. The grate should be fixed on the outside of the body.

The body may be cylindrical or eliptical, and it must have apertures for introducing the fuel and the subjects of the operation, and for conveying away the smoke and vapours.

When the combustion is supported by the current of air naturally excited by the burning of the fuel, it is called a wind-furnace; when it is accelerated by increasing the velocity of the current by bellows, it forms a blast-furnace; and when the

body of the furnace is covered with a dome, which terminates in the chimney, it constitutes a reverberatory furnace.

Furnaces are either fixed, and built of fire-brick, or portable, and fabricated of plate iron. When of iron, they must be lined with some badly conducting and refractory substance, both to prevent the dissipation of heat, and to defend the iron against the action of the fire. A mixture of scales of iron and powdered tiles worked up with blood, hair, and clay, is much recommended; and professor Hagen says, that it is less apt to split and crack when exposed at once to a violent heat, than when dried gradually, according to the common directions. Dr. Black employed two different coatings. Next to the iron he applied a composition of three parts by weight of charcoal, and one of fine clay. These are first mixed in the state of fine powder, and then worked up with as much water as will permit the mass to be formed into balls, which are applied to the sides of the furnace, and beat very firm and compact with the face of a broad hammer, to the thickness of about one inch and a half in general, but so as to give an elliptical form to the cavity. Over this, another lute, composed of six or seven parts of sand, and one of clay, is to be applied in the same manner, to the thickness of about half an inch. These lutes must be allowed to become perfectly dry before the furnace is heated, which should at first be done gradually. They may also be lined with fire bricks of a proper form, accurately fitted and well cemented together before the top plate is screwed on.

The general fault of furnaces is that they admit too much air, which prevents us from regulating the temperature. It either becomes too violent and unmanageable, or when more cold air is admitted than what is necessary for supporting the combustion, it carries off heat, and prevents us from raising the temperature as high as we otherwise would. The superior merit of Dr. Black's furnace consists in the facility with which the admission of air is regulated; and every attempt hitherto made to improve it by increasing the number of its apertures have in reality injured it.

Heat may be applied to vessels employed in chemical operations, directly, as in the open fire and reverberatory furnace. Or through the medium of sand; the sand-bath. Of water; the water-bath. Of steam; the vapour-bath. Of air, as in the muffle.

Changes produced by Chemical Processes.—These consist chiefly in a new mode of aggregation, combination, and decomposition.

The form of aggregation may be altered by fusion, vaporization, condensation, congelation, and coagulation.

Fusion is the conversion of a solid into a liquid by the sole agency of caloric. Substances differ very much in the degrees of their fusibility; some, as water and mercury, existing as fluids in the ordinary temperatures of the atmosphere; while others, as the pure earths, cannot be melted by any heat we can produce.

Liquefaction is commonly employed to express the melting of substances, as tallow, wax, resin, &c. which pass through intermediate states of softness before they become fluid. Fusion is the melting of substances which pass immediately from the solid to the fluid state, as the salts and metals, except iron and platinum.

When, in consequence of fusion, the substances operated on acquire a greater or less degree of transparency, a dense uniform texture, and great brittleness, and exhibit a conchoidal fracture, with a specular surface, and the edges of the fragments very sharp, it is termed vitrification.

In general, simple substances are less fusible than compounds; for example, the simple earths cannot be melted singly, but when mixed are easily fused. The additions which are some times made to refractory substances to promote their fusion are termed fluxes: which fluxes are generally saline bodies.

Thus the alkalies potass and soda promote powerfully the fusion of siliceous stones; but they are only used for accurate experiments. The white-flux is a mixture of a little potass with carbonate of potass, and is prepared by deflagrating together equal parts of nitrate of potass and super-tartrate of potass. When an oxyd is at the same time to be reduced, the black flux is preferred, which is produced by the deflagration of two parts of super-tartrate of potass, and one of nitrate of potass. It differs from the former only in containing a little charcoal. Soap promotes fusion by being converted by the fire into carbonate of soda and charcoal.

Aluminous stones have their fusion greatly promoted by the addition of sub-borate of soda.

Muriat of soda, the mixed phosphate of soda and ammonia, and other salts, are also occasionally employed for the same purpose.

An open fire is sufficient to melt some substances, others require the heat of a furnace.

The vessels in which fusion is performed must resist the heat necessary for the operation. In some instances, an iron or copper ladle or pot may be used, but most commonly crucibles are employed. These are of various sizes. The large crucibles are generally conical, with a small spout for the convenience of pouring out; the small ones are truncated triangular pyramids, and are commonly sold in nests.

The Hessian crucibles are composed of clay and sand, and when good will support an intense heat for many hours, without softening or melting; but they are disposed to crack when suddenly heated or cooled. This inconvenience may be on many occasions avoided, by using a double crucible, and filling up the interstice with sand, or by covering the crucible with a lute of clay and sand, by which means the heat is transmitted more gradually and equally. Those which ring clearly when struck, and are of an uniform thickness, and have a reddish brown colour, without black spots, are reckoned the best.

Wedgewood's crucibles are made of clay mixed with baked clay finely pounded, and are in every respect superior to the Hessian, but they are very expensive.

The black-lead crucibles, formed of clay and plumbago, are very durable, resist sudden changes of temperature, and may be repeatedly used, but they are destroyed when saline substances are melted in them, and suffer combustion when exposed red-hot to a current of air.

When placed in a furnace, crucibles should never be set upon the bars of the grate, but always upon a support. Dr. Kennedy found the hottest part of a furnace to be about an inch above the grate. They may be covered, to prevent the fuel or ashes from falling into them, with a lid of the same materials, or with another crucible inverted over them.

When the fusion is completed, the substance may be either permitted to cool in the crucible, or may be poured into a heated mould anointed with

tallow, never with oil, or what is still better, covered with a thin coating of chalk, which is applied by laying it over with a mixture of chalk diffused in water, and then evaporating the water completely by heat. To prevent the crucible from being broken by cooling too rapidly, it is to be either replaced in the furnace, to cool gradually with it, or covered with some vessel to prevent its being exposed immediately to the air.

Fusion is performed with the intention of weakening the attraction of aggregation; or of separating substances of different degrees of fusibility from each other.

Vaporization is the conversion of a solid or fluid into vapour by the agency of caloric. Although vaporability be merely a relative term, substances are said to be permanently elastic, volatile, or fixed. The permanently elastic fluids or gasses are those which cannot be condensed into a fluid or solid form by any abstraction of caloric we are capable of producing. Fixed substances, on the contrary, are those which cannot be converted into vapour by great increase of temperature. The pressure of the atmosphere has very considerable effect in varying the degree at which substances are converted into vapour. Some solids, unless subjected to very great pressure, are at once converted into vapour, although most of them pass through the intermediate state of fluidity.

Vaporization is employed to separate substances differing in volatility: and to promote chemical action, by disaggregating them.

When employed with either of these views, no regard is paid to the substances volatilized, whether from solids, as in ustulation and charring; or from fluids, as in evaporation. Or whether the substances vaporized are condensed in proper vessels; for example, in a liquid form, as in distillation; or in a solid form, as in sublimation. Or whether the substances vaporized are permanently clastic, and are collected in their gaseous form, in a pneumatic apparatus.

Ustulation is almost entirely a metallurgic operation, and is employed to expel the sulphur and arsenic contained in some metallic ores. It is performed on small quantities in tests placed within a muffle. Tests are shallow vessels made of bone ashes or baked clay. Muffles are vessels of baked clay, of a semi-cylindrical form, the flat side forming the floor, and the arched portion the roof and sides. The end and sides are perforated with holes for the free transmission of air, and the open extremity is placed at the door of the furnace, for the inspection and manipulation of the process. The reverberatory furnace is commonly employed for roasting, and the heat is at first very gentle, and slowly raised to redness. It is accelerated by exposing as large a surface of the substance to be roasted as possible, and by stirring it frequently, so as to prevent any agglutination, and to bring every part in succession to the surface.

Charring may be performed on any of the compound oxyds, by subjecting them to a degree of heat sufficient to expel all their hydrogen, nitrogen, and superabundant oxygen, while the carbon, being a fixed principle, remains behind in the state of charcoal. The temperature necessary for the operation may be produced either by the combustion of other substances, or by the partial combustion of the substance to be charred. In the former case, the operation may be performed in any vessel which excludes the access of air, while it permits the escape of the vapours formed. In the latter, the access of air must be regulated in such a manner, that it may be suppressed whenever the combustion has reached the requisite degree: for if continued to be admitted, the charcoal itself would be dissipated in the form of carbonic acid gas, and nothing would remain but the alkaline and earthy matter, which these substances always contain. When combustion is carried this length, the process is termed incineration. The vapours which arise in the operation of charring are sometimes condensed, as in the manufacture of tar.

Evaporation is the conversion of a fluid into vapour, by its combination with caloric. In this process, the atmosphere is not a necessary agent, but rather a hindrance, by its pressure. This forms a criterion between chemical evaporation and spontaneous evaporation, which is merely the solution of a fluid in air.

It is performed in open, shallow, or hemispherical vessels of silver, tinned copper or iron, earthen-ware or glass. The necessary caloric may be furnished by means of an open fire, a lamp, or a furnace, either immediately, or with the intervention of sand, water, or vapour. The degree of heat must be regulated by the nature of the substance operated on. In general, it should not be greater than what is absolutely necessary.

Evaporation may be partial: producing from saline fluids, concentration: and from viscid fluids, inspissation: or it may be total, and produce exsiccation.

Concentration is employed to lessen the quantity of diluting fluids, which is called dephlegmation: or as a preliminary step to crystallization.

Inspissation is almost confined to animal and vegetable substances; and as these are apt to be partially decomposed by heat, or to become empyreumatic, it should always be performed, especially towards the end of the process, in a water or vapour bath.

Exsiccation is here taken in a very limited sense; for the term is also with propriety used to express the drying of vegetables by a gentle heat, the efflorescence of salts, and the abstraction of moisture from mixtures of insoluble powders with water, by means of chalk stones or powdered chalk pressed into a smooth mass. At present, we limit its meaning to the total expulsion of moisture from any body by means of caloric.

The exsiccation of compound oxyds should always be performed in the water bath.

Salts are deprived of their water of crystallization by exposing them to the action of heat in a glass vessel or iron ladle. Sometimes they first dissolve in their water of crystallization, or undergo what is called the watery fusion, and are afterwards converted into a dry mass by its total expulsion; as in the calcination of borax or burning of alum.

When exsiccation is attended with a crackling noise, and splitting of the salt, as in muriate of soda, it is termed decrepitation, and is performed by throwing into a heated iron vessel small quantities of the salt at a time, covering it up, and waiting until the decrepitation be over, before a fresh quantity is thrown in.

Exsiccation is performed on saline bodies, to render them more acrid or pulverulent, or to prepare them for chemical operations. Animal and vegetable substances are exsiccated to give them a solid form, and to prevent their fermentation.

Condensation is the reverse of expansion, and is produced either by mechanical pressure forcing out the caloric in a sensible form, as water is squeezed out of a sponge, or by the chemical ab-

straction of caloric, which is followed by an approximation of the particles of the substance.

This latter kind alone is the object of our investigation at present. In this way we may be supposed to condense substances existing naturally as gases or vapours; or substances naturally solid or fluid, converted into vapours by adventitious circumstances.

The former instance is almost supposititious: for we are not able, by any diminution of temperature, to reduce the permanently elastic fluids to a fluid or solid state.

The latter instance is always preceded by vaporization, and comprehends those operations in which the substances vaporized are condensed in proper vessels.

When the product is a fluid, it is termed distillation; when solid, sublimation. Distillation is said to be performed, *viâ humidâ*, when fluids are the objects of the operation. *Viâ siccâ*, when solids are subjected to the operation, and the fluid product arises from decomposition, and a new arrangement of the constituent principles.

The objects of distillation are to separate more volatile fluids from less volatile fluids or solids: to promote the union of different substances; and to generate new products by the action of fire.

In all distillations, the heat applied should not be greater than what is necessary for the formation of the vapour, and even to this degree it should be gradually raised. The vessels also in which the distillation is performed should never be filled above one-half, and sometimes not above one-fourth, lest the substance contained in them should boil over.

As distillation is a combination of evaporation and condensation, the apparatus consists of two principal parts: the vessels in which the vapours are formed: and those in which they are condensed.

The vessels employed for both purposes are very various in their shapes, according to the manner in which the operation is conducted. The first difference depends on the direction of the vapour after its formation. It either descends, ascends, or passes off by the side; constituting a distillation *per descensum, per ascensum*, or *per latus*.

In the distillation *per descensum*, a perforated plate of tinned iron, or other materials, is fixed within any convenient vessel, so as to leave a space beneath it. On this the subject of the operation is laid, and over it is placed another plate, accurately closing the mouth of the vessel, and sufficiently strong to support the fuel. Thus the heat is applied from above, and the vapour is forced to descend into the inferior cavity, where it is condensed. In this way the oil of cloves is prepared, and on the same principles tar is manufactured, and mercury and zinc are separated from their ores.

In the distillation *per ascensum*, the vapour is allowed to arise to some height, and then is conveyed away to be condensed. The vessel most commonly employed for this purpose is the common copper still, which consists of a body for containing the materials, and a head into which the vapour ascends. From the middle of the head a tube rises for a short way, and is then reflected downwards, through which the steam passes to be condensed. Another kind of head, rising to a great height before it is reflected, is sometimes used for separating fluids, which differ little in volatility, as it was supposed that the less volatile vapours would be condensed and fall back into the still, while only the more volatile vapours would arise to the top, so as to pass to the refrigeratory. The same object may be more conveniently attained by managing the fire with caution and address. The greater the surface exposed, and the less the height the vapours have to ascend, the more rapidly does the distillation proceed; and so well are these principles understood by the Scotch distillers, that they do not take more than three minutes to discharge a still containing gallons of fluid.

The condensing apparatus used with the common still is very simple. The tube in which the head terminates is inserted into the upper end of a pipe, which is kept cool by passing through a vessel filled with water, called the refrigeratory. This pipe is commonly made of a serpentine form; but as this renders it difficult to be cleaned, Dr. Black recommends a sigmoid pipe. The refrigeratory may be furnished with a stop-cock, that when the water it contains becomes too hot, and does not condense all the vapour produced, it may be changed for cold water. From the lower end of the pipe, the product of the distillation drops into the vessel destined to receive it; and we may observe, that when any vapour issues along with it, we should either diminish the power of the fire, or change the water in the refrigeratory. There was a process of this kind, called circulation. It consisted in arranging the apparatus, so that the vapours were no sooner condensed into a fluid form, than this fluid returned back into the distilling vessels, to be again vaporized; and was effected by distilling in a glass vessel, with so long a neck that the vapours were condensed before they escaped at the upper extremity, or by inverting one matrass within another.

When corrosive substances are distilled in this way, the cucurbit and alembic are used; but these substances are more conveniently distilled *per latus*.

The distillation *per latus* is performed in a retort, or pear-shaped vessel having the neck bent to one side. The body of a good retort is well rounded, uniform in its appearance, and of an equal thickness, and the neck is sufficiently bent to allow the vapours, when condensed, to run freely away, but not so much as to render the application of the receiver inconvenient, or to bring it too near the furnace. The passage from the body into the neck must be perfectly free and sufficiently wide, otherwise the vapours produced in the retort only circulate in its body, without passing over into the receiver. For introducing liquors into the retort without soiling its neck, which would injure the product, a bent funnel is necessary. It must be sufficiently long to introduce the liquor directly into the body of the retort; and in withdrawing it, we must carefully keep it applied to the upper part of the retort, that the drop hanging from it may not touch the inside of the neck. In some cases, where a mixture of different substances is to be distilled, it is convenient and necessary to have the whole apparatus properly adjusted before the mixture is made, and we must therefore employ a tubulated retort, or a retort furnished with an aperture, accurately closed with a ground stopper.

This tubulature should be placed on the upper convex part of the retort before it bends to form the neck, so that a fluid poured through it may fall directly into the body without soiling the neck.

Retorts are made of various materials. Flint glass is commonly used when the heat is not so great as to melt it. For distillations which require excessive degrees of heat, retorts of earthen-ware,

or coated glass retorts, are employed. Quick-silver is distilled in iron retorts.

The simplest condensing apparatus used with the retort, is the common glass-receiver; which is a vessel of a conical or globular form, having a neck sufficiently wide to admit of the neck of the retort being introduced within it. To prevent the loss and dissipation of the vapours to be condensed, the retort and receiver may be accurately ground to each other, or secured by some proper lute. To prevent the receiver from being heated by the caloric evolved during the condensation of vapours in it, we must employ some means to keep it cool.

It is either immersed in cold water, or covered with snow, or pounded ice, or a constant evaporation is supported from its surface, by covering it with cloth, which is kept moist by means of the descent of water, from a vessel placed above it, through minute syphons or spongy worsted threads. But as, during the process of distillation, permanently elastic fluids are often produced, which would endanger the breaking of the vessels, these are permitted to escape either through a tubulature, or hole in the side of the receiver, or rather through a hole made in the luting. Receivers having a spout issuing from their side are used when we wish to keep separate the products obtained at different periods of any distillation. For condensing very volatile vapours, a series of receivers, communicating with each other, termed adopters, were formerly used; but these are now entirely superseded by Woulfe's apparatus, which consists of a tubulated retort, adapted to a tubulated receiver. With the tubulature of the receiver a three-necked bottle is connected by means of a bent tube, the further extremity of which is immersed, one or more inches, in some fluid contained in the bottle. A series of two or three similar bottles are connected with this first bottle in the same way. In the middle tubulature of each bottle a glass tube is fixed, having its lower extremity immersed about a quarter of an inch in the fluid. The height of the tube above the surface of the fluid must be greater than the sum of the columns of fluids standing over the further extremities of the connecting tubes, in all the bottles or vessels more remote from the retort. Tubes so adjusted are termed tubes of safety, for they prevent that reflux of fluid from the more remote into the nearer bottles, and into the receiver itself, which would otherwise inevitably happen, on any condensation of vapour taking place in the retort, receiver, or nearer bottles. Different contrivances for the same purpose have been described by Messrs. Welter and Burkitt; and a very ingenious mode of connecting the vessels without lute, has been invented by citizen Girard, but they would not be easily understood without plates. The further tubulature of the last bottle is commonly connected with a pneumatic apparatus, by means of a bent tube. When the whole is properly adjusted, air blown into the retort should pass through the receiver, rise in bubbles through the fluids contained in each of the bottles, and at last escape by the bent tube. In the receiver, those products of distillation are collected, which are condensable by cold alone. The first bottle is commonly filled with water, and the others with alkaline solutions, or other active fluids; and as the permanently elastic fluids produced are successively subjected to the action of all these, only those gasses will escape by the bent tube which are not absorbable by any of them.

In separating permanently elastic fluids or gasses from the substances in which they are found, we are compelled to employ a distinct pneumatic apparatus; and the gass may then be received either into vessels absolutely empty, or filled with some fluid on which it exerts no action.

The first mode of collecting gasses may be practised by means of a bladder, moistened sufficiently to make it perfectly pliable, and then compressed so as to press out every particle of air from its cavity. In this state it may be easily filled with any gass. An oiled silk bag will answer the same purpose, and is more convenient in some respects, as it may be made of any size or form.

Glass or metallic vessels, such as balloons, may also be emptied for the purpose of receiving gasses, by fitting them with a stop-cock, and exhausting the air from them by means of an air-pump.

But the second mode of collecting gasses is the most convenient and common. In which case the vessels may be filled either with a fluid lighter, or heavier than the gass to be received into it.

The former method is seldom employed; but if we conduct a stream of any gass heavier than atmospheric air, such as carbonic acid gass, muriatic acid gass, &c. to the bottom of any vessel, it will gradually displace the air, and fill the vessel.

On the contrary, a gass lighter than atmospheric air, such as hydrogen, may be collected in an inverted vessel by conducting a stream of it to the top.

But gasses are most commonly collected by conducting the stream of gass into an inverted glass jar, or any other vessel filled with water or mercury. The gass ascends to the upper part of the vessel, and displaces the fluid. In this way gass may be kept a very long time, provided a small quantity of the fluid be left in the vessels, which prevents both the escape of the gass and the admission of atmospheric air.

The vessels may be of various shapes; but those most commonly employed are cylindrical. They may be either open only at one extremity, or furnished at the other with a stop-cock.

The manner of filling them with fluid is to immerse them completely in it, with the open extremity directed a little upwards, so that the whole air may escape from them, and then inverting them with their mouths downwards.

For filling them with convenience, a trough or cistern is commonly used. This should either be hollowed out of a solid block of wood or marble; or, if it be constructed of wood simply, be well painted or lined with lead or tinned copper. Its size may vary very much; but it must contain a sufficient depth of fluid to cover the largest transverse diameter of the vessels to be filled in it. At one end or side there should be a shelf for holding the vessels after they are filled. This shelf should be placed about an inch and a half below the surface of the fluid, and should be perforated with several holes, forming the apices of corresponding conical excavations, on the lower side, through which, as through inverted funnels, gaseous fluids may be more easily introduced into the vessels placed over them.

In general the vessels used with a mercurial apparatus should be stronger and smaller than those for a water cistern, and we must have a variety of glass and elastic tubes for conveying the gasses from the vessels in which they are formed to the funnels under the shelf.

The repeated distillation of any fluid is denominated rectification. When distillation renders the fluid stronger, or abstracts water from it, it is termed dephlegmation. When a fluid is distilled

off from any substance, it is called abstraction: and if the product be redistilled from the same substance, or a fresh quantity of the same substance, it is denominated cohobation.

The difference between distillation and sublimation is only in the form of the product. When it is compact, it is termed a sublimate; when loose and spongy, it formerly had the appellation of flowers. Sublimation is sometimes performed in a crucible, and the vapours are condensed in a paper cone, or in another crucible inverted over it; sometimes in the lower part of a glass flask, cucurbit or phial, and the condensation is effected in the upper part or capital, and sometimes in a retort with a very short and wide neck, to which a conical receiver is fitted. The heat is most commonly applied through the medium of a sandbath; and the degree of heat, and the depth to which the vessel is inserted in it, are regulated by the nature of the sublimation.

Congelation is the reduction of a fluid to a solid form, in consequence of the abstraction of caloric. The means employed for abstracting the caloric are the evaporation of volatile fluids, the solution of solids, and the contact of cold bodies.

Congelation is the conversion of a fluid into a solid of greater or less consistence, merely in consequence of a new arrangement of its particles, as during the process there is no separation of caloric or any other substance. The means of producing coagulation are increase of temperature, and the addition of certain substances, as acids and runnets.

Chemical combination is the intimate union of the particles of at least two heterogeneous bodies. It is the effect resulting from the exertion of the attraction of affinity, and is therefore subjected to all the laws of affinity.

To produce the chemical union of any two or more bodies, it is necessary that they possess an affinity for each other; that their particles come into actual contact; that the strength of the affinity be greater than any counteracting causes which may be present.

The principal counteracting causes are, the attraction of aggregation, and affinities for other substances. The means to be employed for overcoming the action of other affinities will be treated of under Decomposition. The attraction of aggregation is overcome by means of mechanical division, or the action of caloric.

Combination is facilitated by increasing the points of actual contact, by the means of mechanical agitation: by condensation and compression. And the processes employed for producing combination may be considered with regard to the nature of the substances combined; and, to the nature of the compound produced. Gasses combine with gasses; and dissolve fluids or solids; or are absorbed by them. Fluids are dissolved in gasses, or absorb them. They combine with fluids, and dissolve solids; or are rendered solid by them. Solids are solved in fluids and in gasses; or absorb gasses and solidify fluids.

The combination of gasses with each other, in some instances, takes place when simply mixed together; thus nitrous and oxygen gasses combine as soon as they come into contact; in other instances, it is necessary to elevate their temperature to a degree sufficient for their inflammation, either by means of the electric spark, or the contact of an ignited body, as in the combination of oxygen gass with hydrogen or nitrogen gass.

When gasses combine with each other there is always a considerable diminution of bulk, and not unfrequently they are condensed into a liquid or solid form. Hydrogen and oxygen gasses form water; muriatic acid and ammonia gasses form solid muriate of ammonia. But when the combination is effected by ignition, a violent expansion, which endangers the bursting of the vessels, previously takes place, in consequence of the increase of temperature.

Solution is the diminution of aggregation in any solid or fluid substance, in consequence of its entering into chemical combination. The substance, whether solid or fluid, whose aggregation is lessened, is termed the solvend; and the substance by whose agency the solution is effected is often called the menstruum or solvent.

Solution is said to be performed *viâ humidâ*, when the natural form of the solvent is fluid; but when the agency of heat is necessary to give the solvent its fluid form, the solution is said to be performed *viâ siccâ*.

The dissolving power of each menstruum is limited, and is determinate with regard to each solvend. The solubility of bodies is also limited and determinate with regard to each menstruum.

When any menstruum has dissolved the greatest possible quantity of any solvend, it is said to be saturated with it. But, in some cases, although saturated with one substance, it is still capable of dissolving others. Thus a saturated solution of muriat of soda will dissolve a certain quantity of nitrat of potass, and after that a portion of muriat of ammonia.

The dissolving power of solvents, and consequently the solubility of solvends, are generally increased by increase of temperature: and conversely, this power is diminished by diminution of temperature; so that, from a saturated solution, a separation of a portion of the solvend generally takes place on any reduction of temperature. This property becomes extremely useful in many chemical operations, especially in crystallization.

Particular terms have been applied to particular cases of solution.

The solution of a fluid in the atmosphere is termed spontaneous evaporation. It is promoted by exposing a large surface, by frequently renewing the air in contact with the surface, and by increase of temperature.

Some solids have so strong an affinity for water, that they attract it from the atmosphere in sufficient quantity to dissolve them. These are said to deliquesce. Others, on the contrary, retain their water of crystallization with so weak a force, that the atmosphere attracts it from them, so that they crumble into powder. These are said to effloresce. Both operations are promoted by exposing large surfaces, and by a current of air; but the latter is facilitated by a warm dry air, and the former by a cold humid atmosphere.

Solution is also employed to separate substances, (for example, saline bodies), which are soluble in the menstruum, from others which are not.

When our object is to obtain the soluble substance in a state of purity, the operation is termed lixiviation, and as small a quantity of the menstruum as is possible is used. When, however, it is employed to free an insoluble substance from soluble impurities, it is termed edulcoration, which is best performed by using a very large quantity of the menstruum.

Organic products being generally composed of

heterogeneous substances, are only partially soluble in the different menstrua. To the solution of any of these substances while the others remain undissolved, the term extraction is applied; and when, by evaporation, the substance extracted is reduced to a solid form, it is termed an extract, which is hard or soft, watery or spiritous, according to the degree of consistency it requires, and the nature of the menstruum employed.

Infusion is employed to extract the virtues of aromatic and volatile substances, which would be dissipated by decoction, and destroyed by maceration, and to separate substances of easy solution from others which are less soluble. The process consists in pouring upon the substance to be infused, placed in a proper vessel, the menstruum, either hot or cold, according to the direction, covering it up, agitating it frequently, and after a due time straining or decanting off the liquor, which is now termed the infusion.

Maceration differs from infusion, in being continued for a longer time, and can only be employed for substances which do not easily ferment or spoil.

Digestion, on the other hand, differs from maceration only in the activity of the menstruum being promoted by a gentle degree of heat. It is commonly performed in a glass matrass, which should only be filled one third, and covered with a piece of wet bladder, pierced with one or more small holes, so that the evaporation of the menstruum may be prevented as much as possible, without risk of bursting the vessel. The vessel may be heated, either by means of the sun's rays, of a common fire, or of the sand-bath; and when the last is employed, the vessel should not be sunk deeper in the sand than the portion that is filled. Sometimes, when the menstruum employed is valuable, a distilling apparatus is used to prevent any waste of it. At other times, a blind capital is luted on the matrass, or a smaller matrass is inverted within a larger one; and as the vapour which arises is condensed in it, and runs back into the larger, the process in this form has got the name of circulation, upon which we have observed already.

Decoction is performed by subjecting the substances operated on to a degree of heat which is sufficient to convert the menstruum into vapour, and can only be employed with advantage for extracting principles which are not volatile, and from substances whose texture is so dense and compact as to resist the less active methods of solution. When the mentruum is valuable, that portion of it which is converted into vapour is generally saved by condensing it in a distilling apparatus.

Solutions in alcohol are termed tinctures, and in vinegar or wine, medicated vinegars or wines. The solution of metals in mercury is termed amalgamation. The combinations of other metals with each other form alloys.

Absorption is the condensation of a gass into a fluid or solid form, in consequence of its combination with a fluid or solid. It is facilitated by increase of surface and agitation, and the power of absorption in fluids is much increased by compression and diminution of temperature although in every instance it be limited and determinate. Dr. Nooth invented an ingenious apparatus for combining gasses with fluids, and Messrs. Schweppe, Paul, and Cuthbertson, have very advantageously employed compression.

Fluids often become solid by entering into combination with solids, and this change is always accompanied by considerable increase of temperature, as in the slaking of lime.

Chemical decomposition is the separation of the elementary parts of bodies which were chemically combined, and can only be effected by the agency of substances possessing a stronger affinity for one or more of the constituents of the compound than these possess for each other.

Decomposition has acquired various appellations, according to the phænomena which accompany it.

Dissolution differs from solution in being accompanied by a decomposition or change in the nature of the substance dissolved. Thus, we correctly say, a solution of lime in muriatic acid, and a dissolution of chalk in muriatic acid.

Sometimes a gass is separated during the action of bodies on each other. When this escapes with considerable violence and agitation of the fluid, it is termed effervescence. The gass is very frequently allowed to escape into the atmosphere, but at other times is either collected in a pneumatic apparatus, or made to enter into some new combination. The vessels in which an effervescing mixture is made should be high and sufficiently large, to prevent any loss of the materials from their running over, and in some cases the mixture must be made slowly and gradually.

Precipitation is the reverse of solution. It comprehends all those processes in which a solid is obtained by the decomposition of a solution. The substance separated is termed a precipitate, if it sink to the bottom of the fluid; or a cream, if it swim above it. Precipitation, like solution, is performed either *viâ humidâ* or *viâ siccâ*; and is effected by lessening the quantity of the solvent by evaporation; by diminishing its powers, as by reduction of temperature, or dilution; or by the addition of some chemical agent, which form its more powerful affinities. Either combines with the solvent, and precipitates the solvend; or forms itself an insoluble compound with some constituent of the solution.

The objects of precipitation are, the separation of substances from solutions in which they are contained; the purification of solutions from precipitable impurities; or the formation of new combinations.

The two first means of precipitation have been already noticed.

In performing it in the last manner, we may observe the following rules: the solution and precipitant must possess the requisite degree of purity. The solution should be perfectly saturated, to avoid unnecessary expenditure of the solvent or precipitant. The one is to be added slowly and gradually to the other. After each addition, they are to be thoroughly mixed by agitation. We must allow the mixture to settle, after we think that enough of the precipitant has been added, and try a little of the clear solution, by adding to it some of the precipitant; if any precipitation takes place, we have not added enough of the precipitant. This is necessary, not only to avoid loss, but in many instances, the precipitant, if added in excess, re-dissolves or combines with the precipitate.

After the precipitation is completed, the precipitate is to be separated from the supernatant fluid by some of the means already noticed.

When the precipitate is the chief object of our process, and when it is not soluble in water, it is often advisable to dilute, to a considerable degree,


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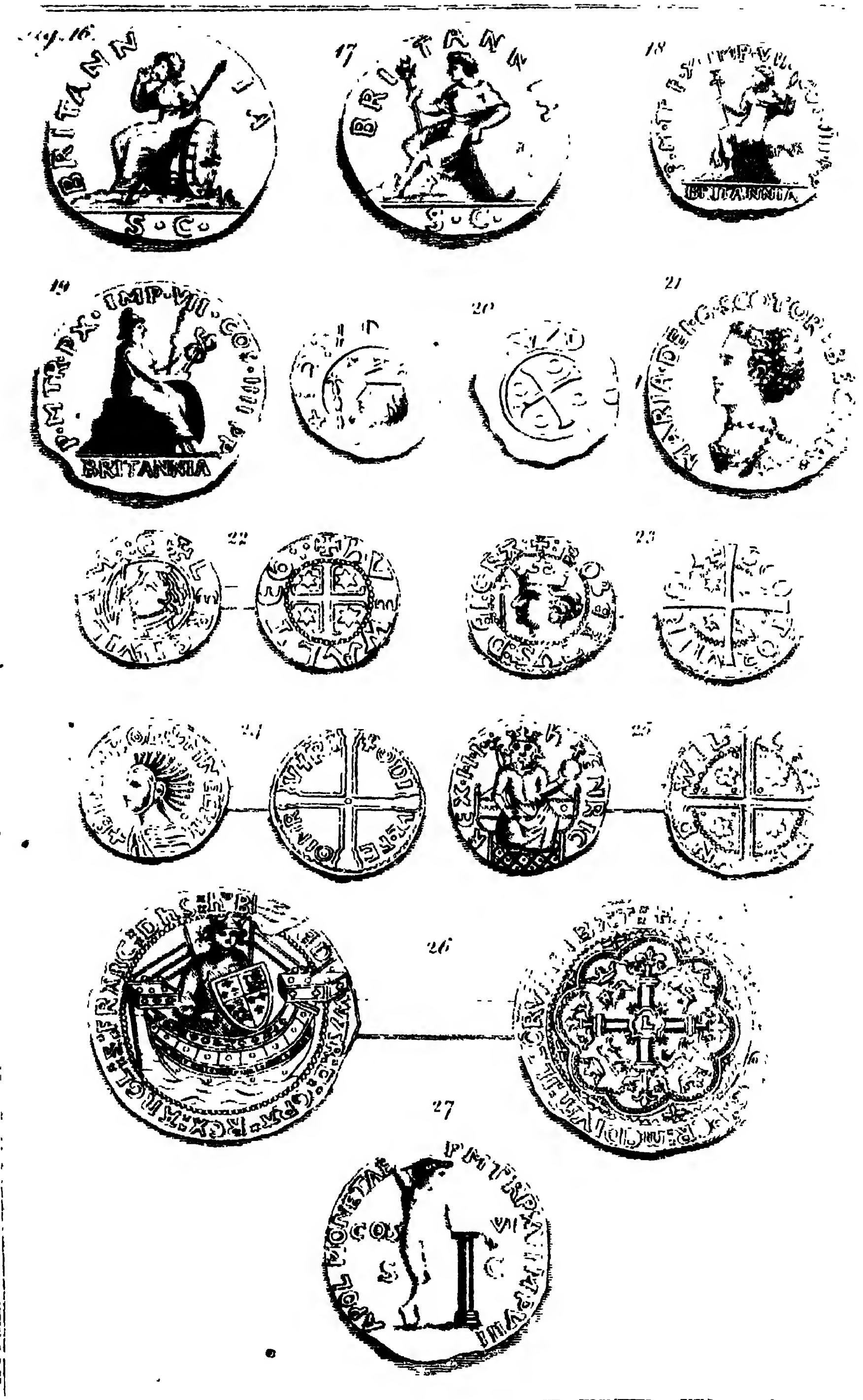
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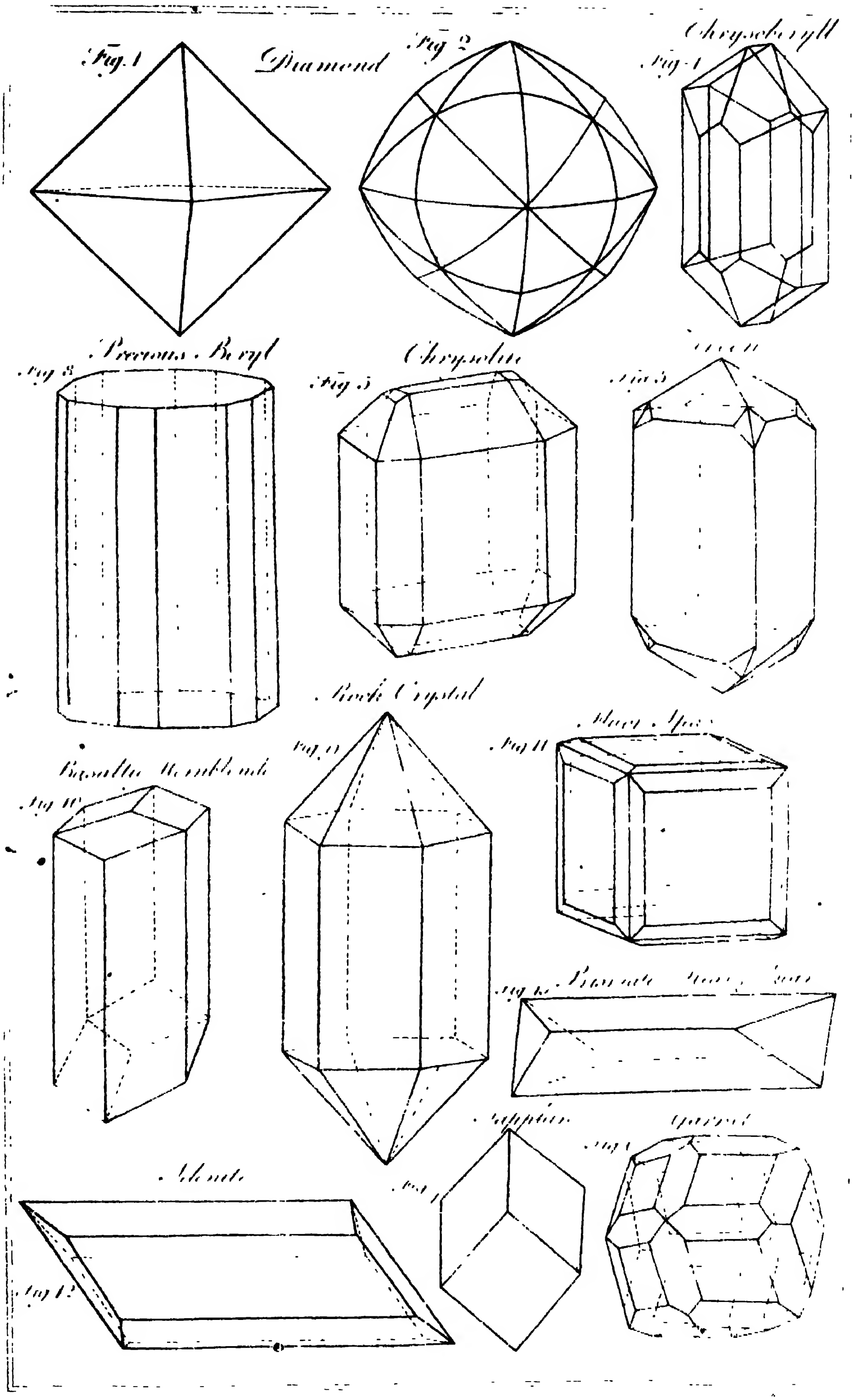
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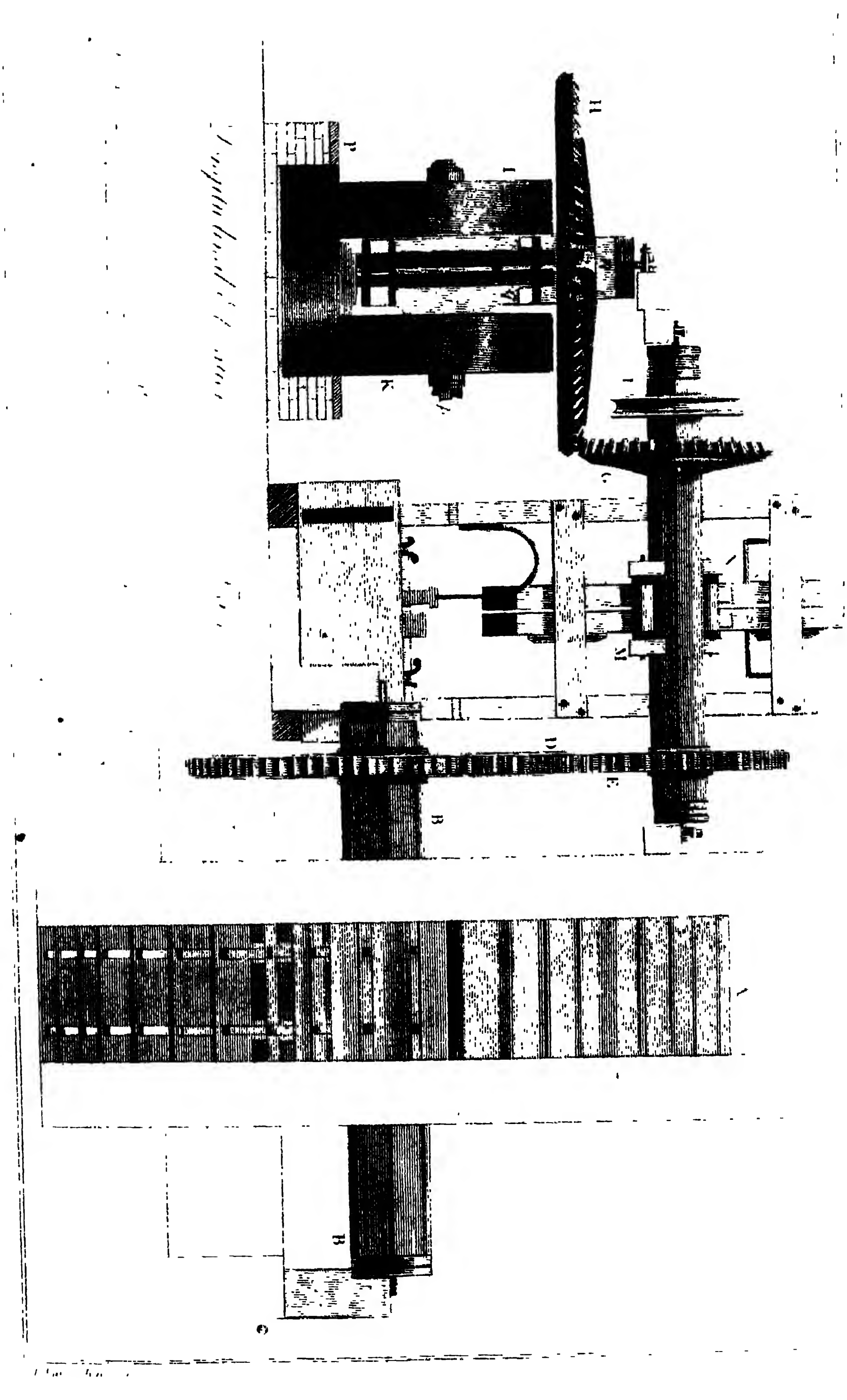
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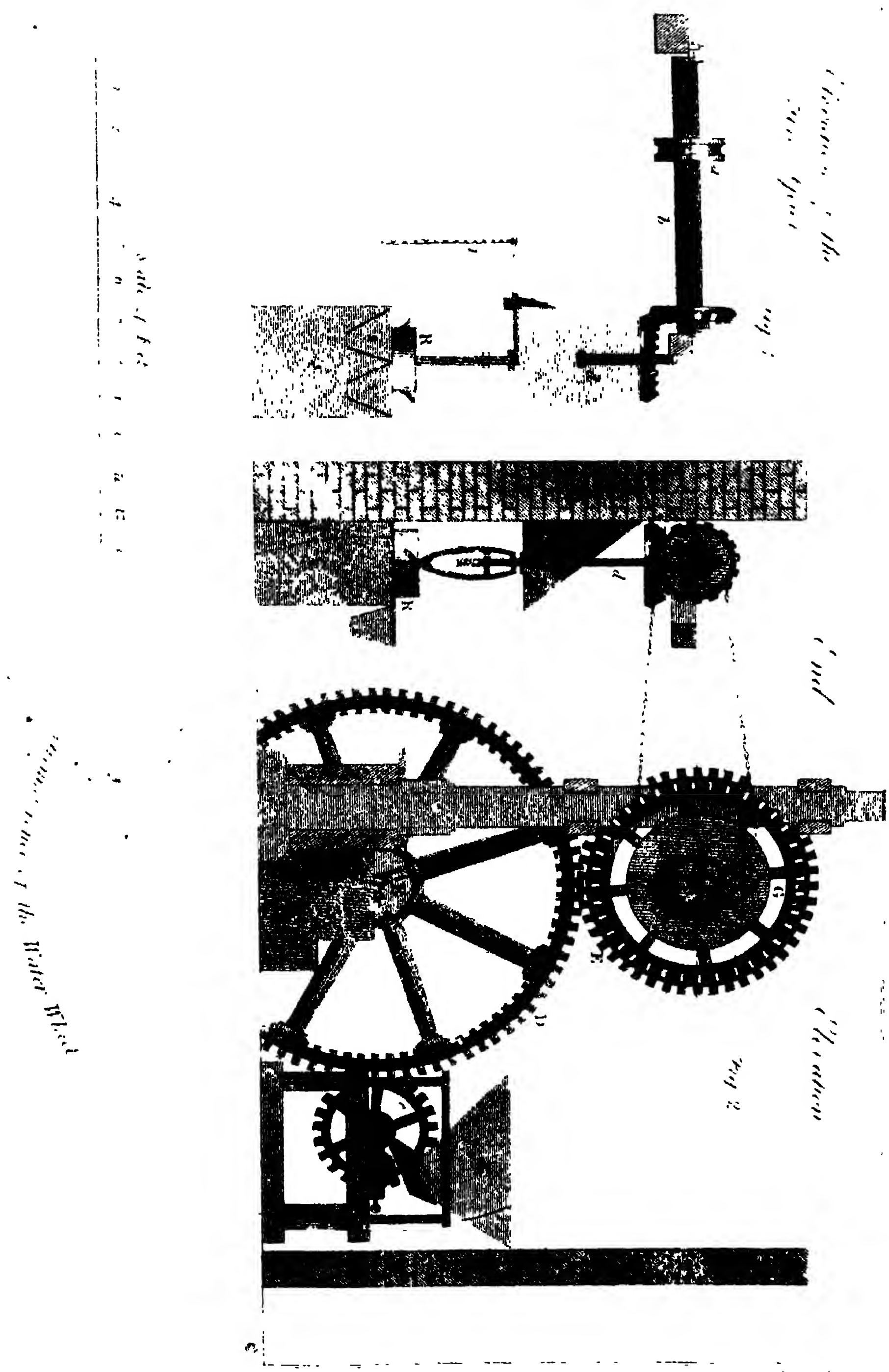

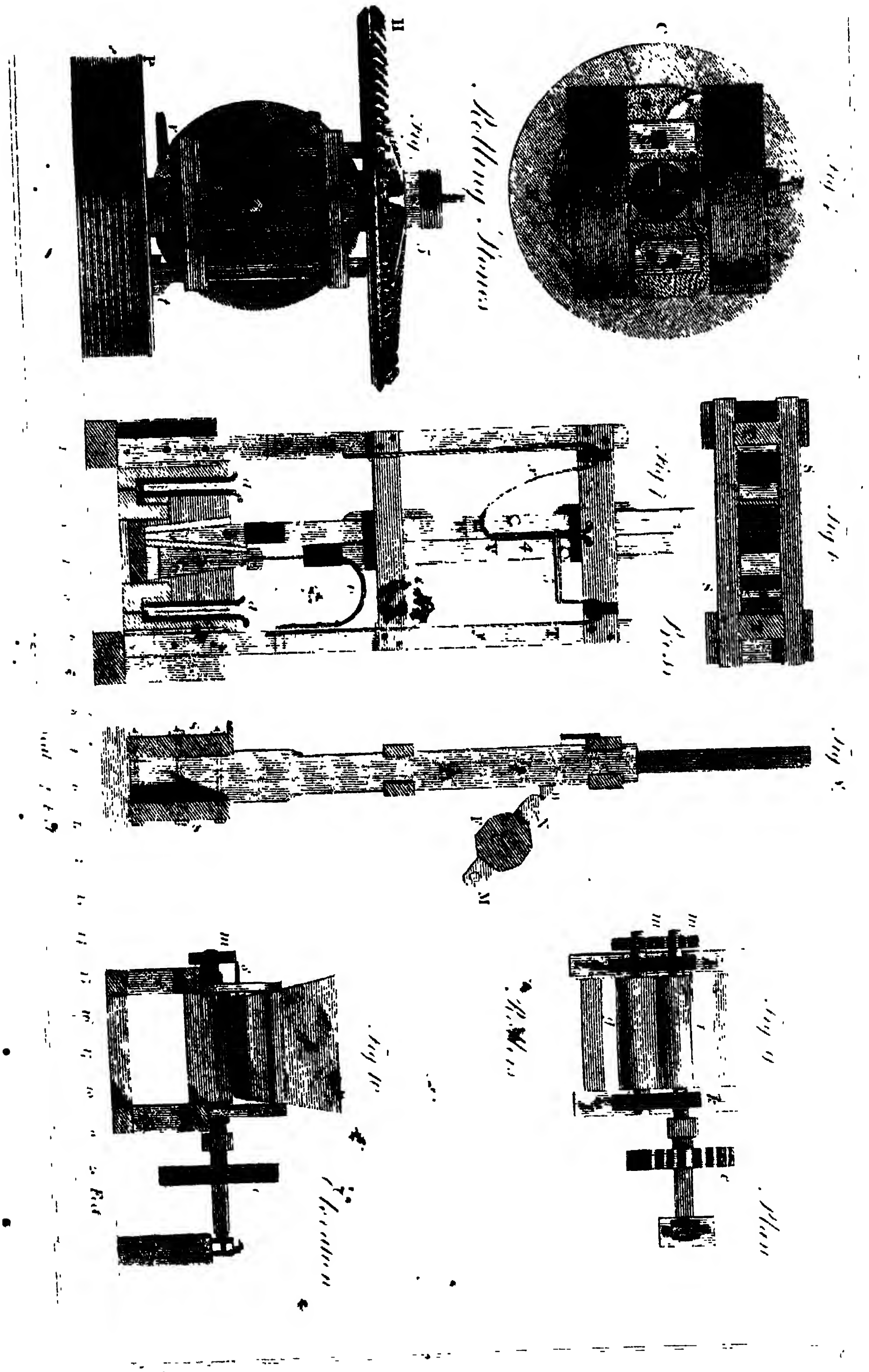

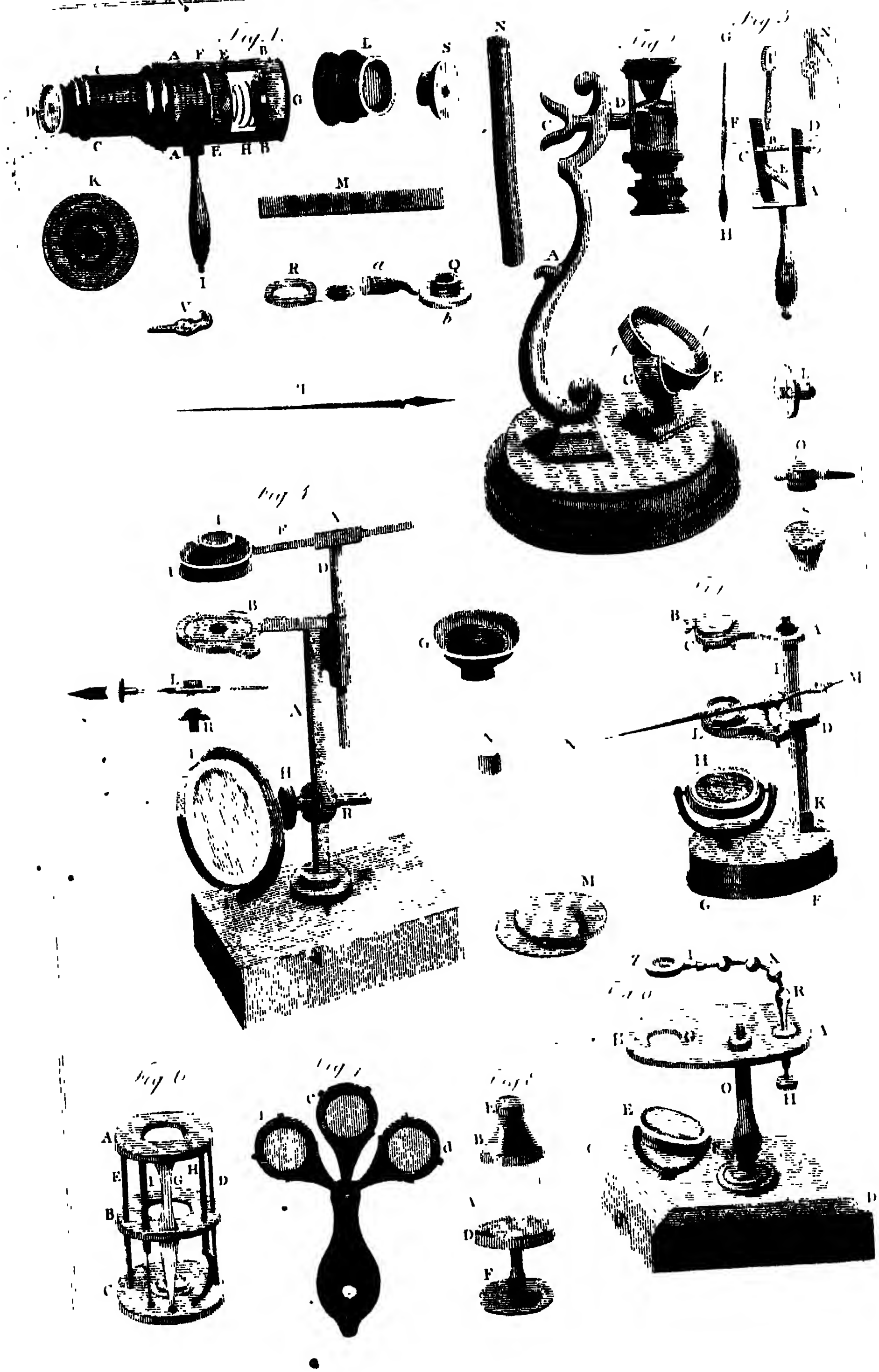

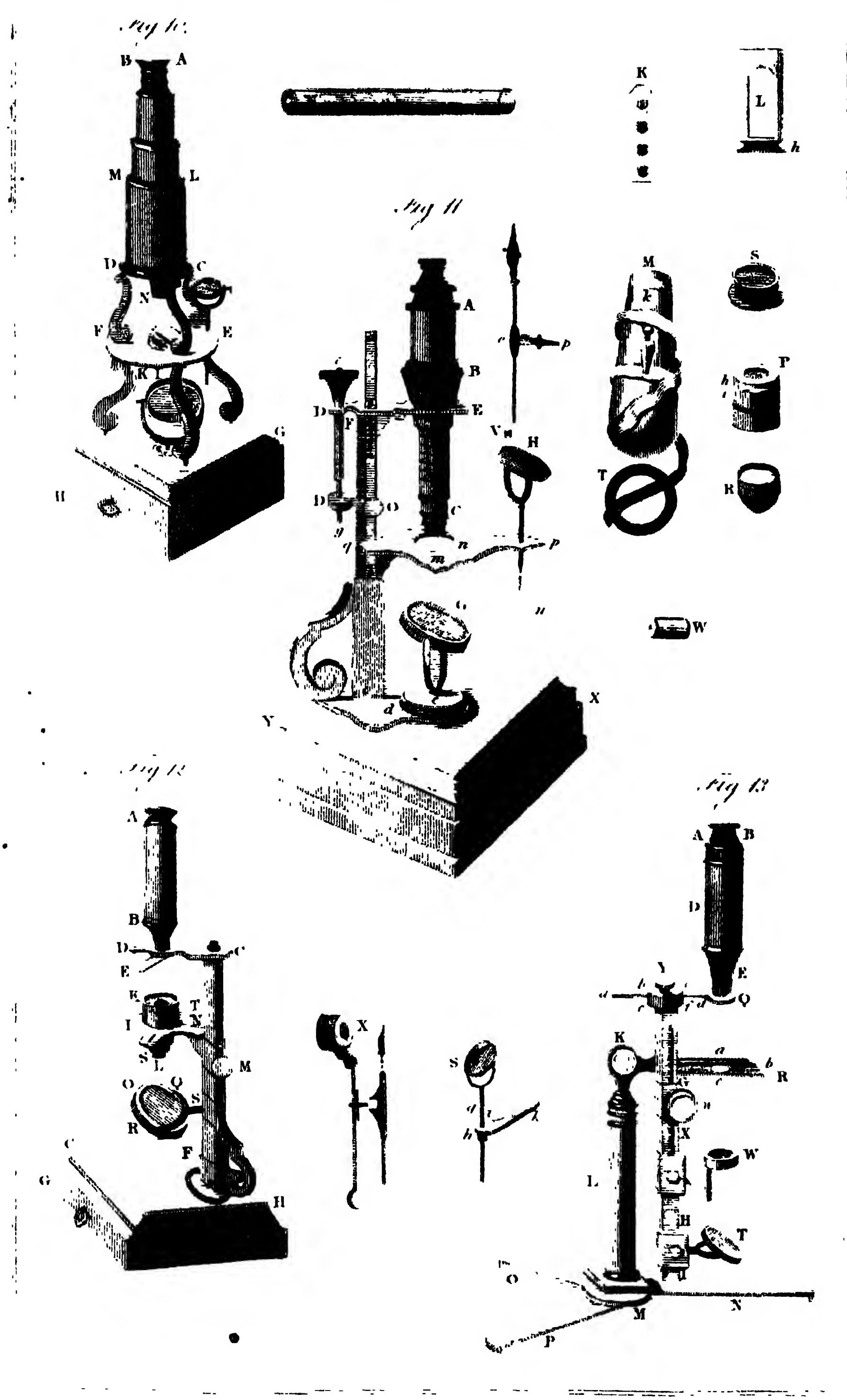
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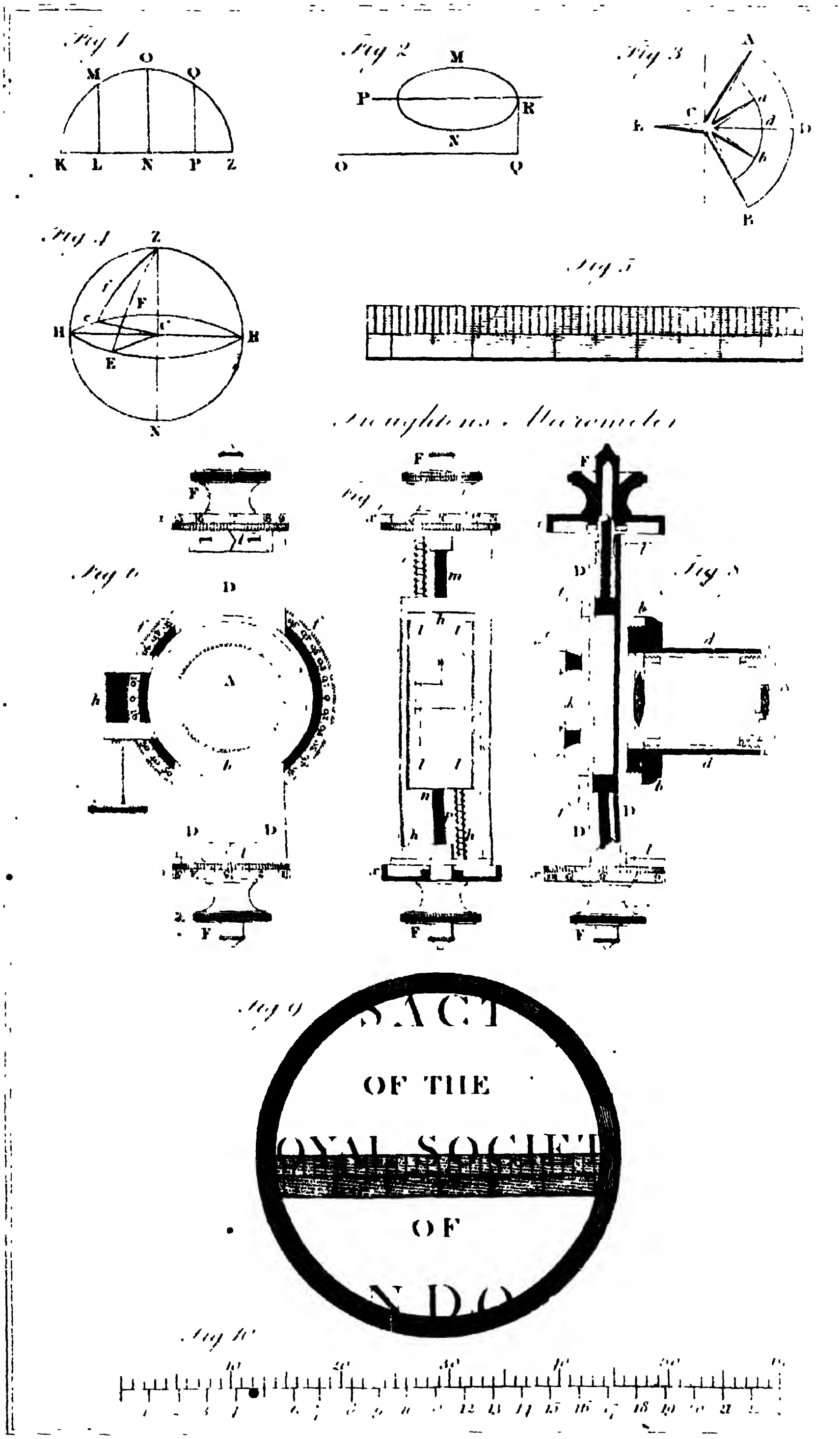
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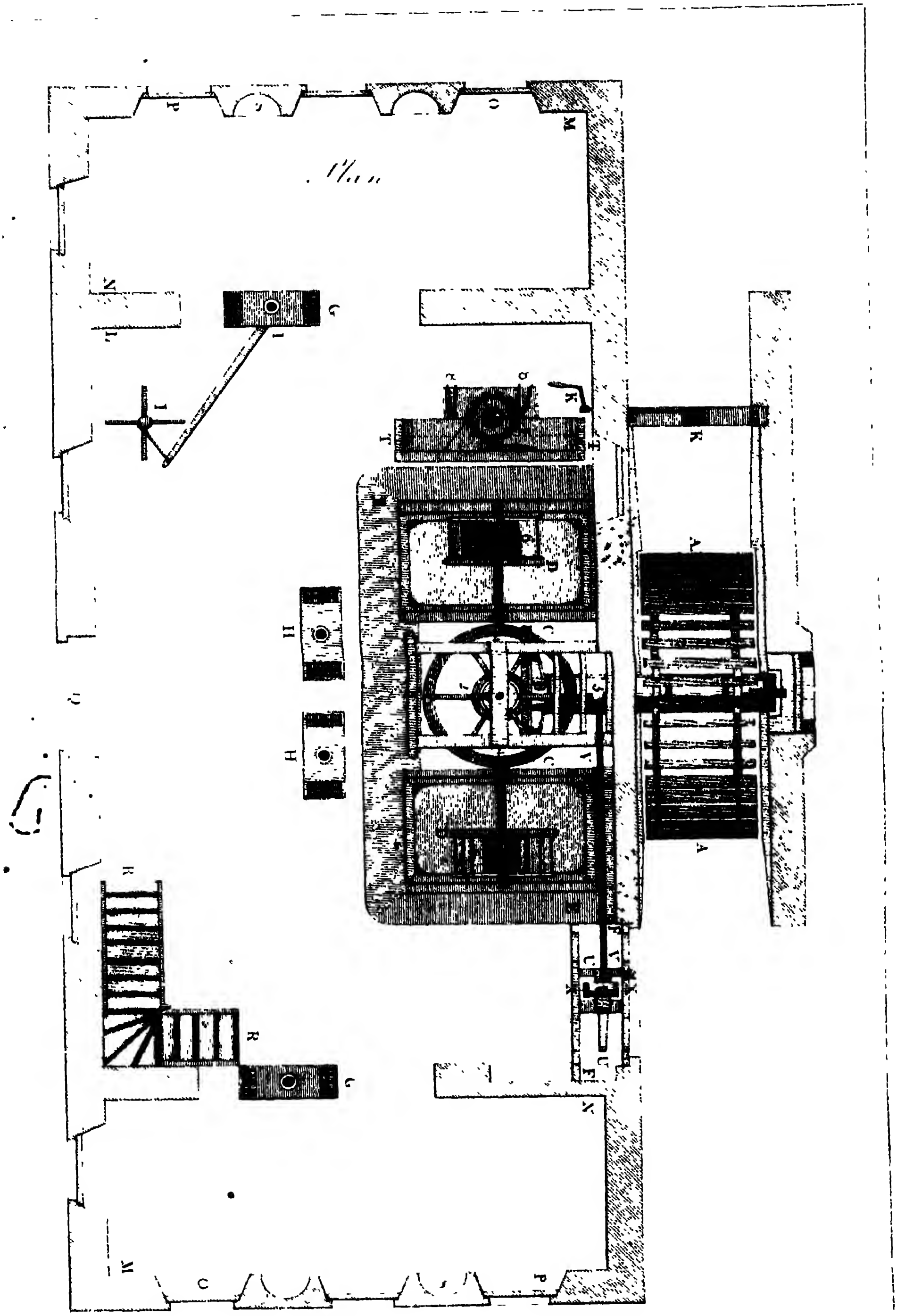

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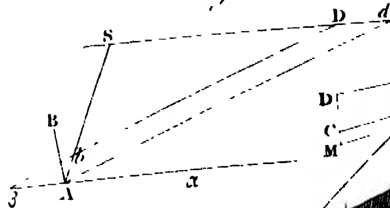

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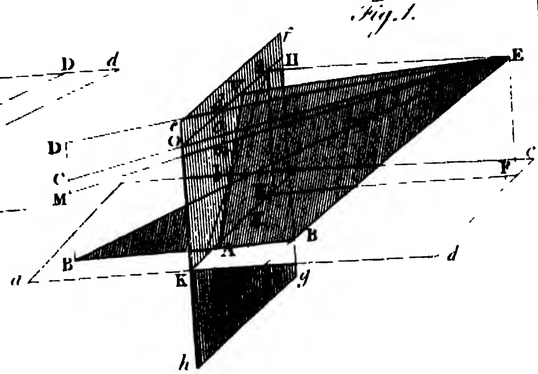

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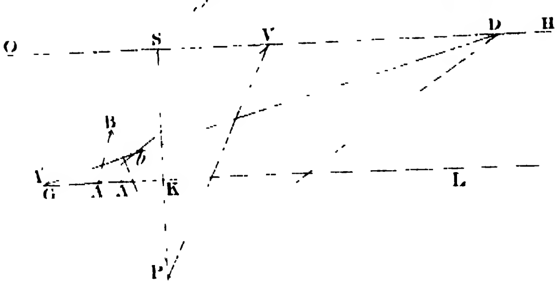

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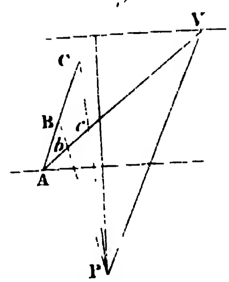

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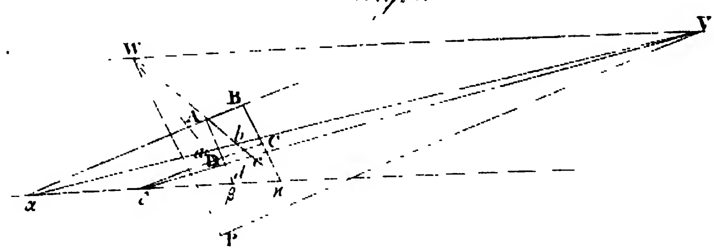

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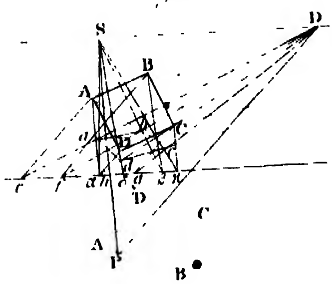

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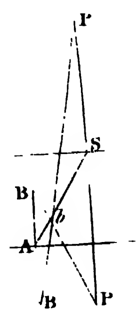

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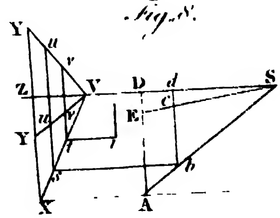

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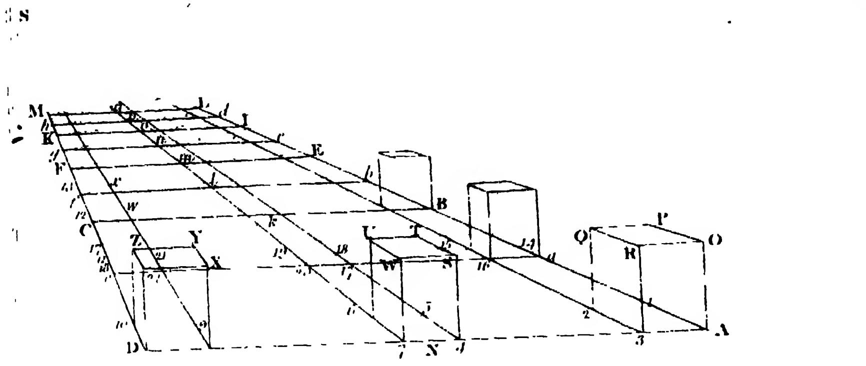


Fig. 3 Fig. 2

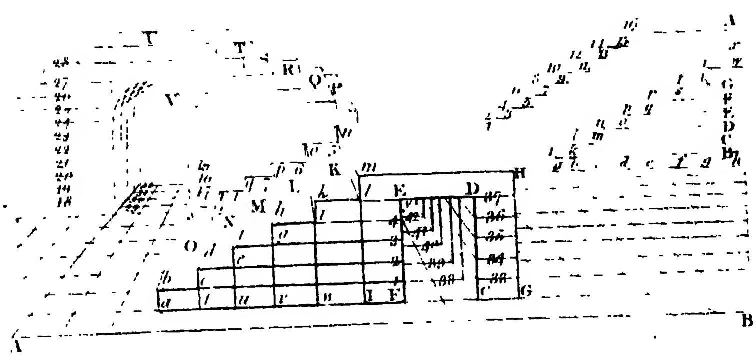
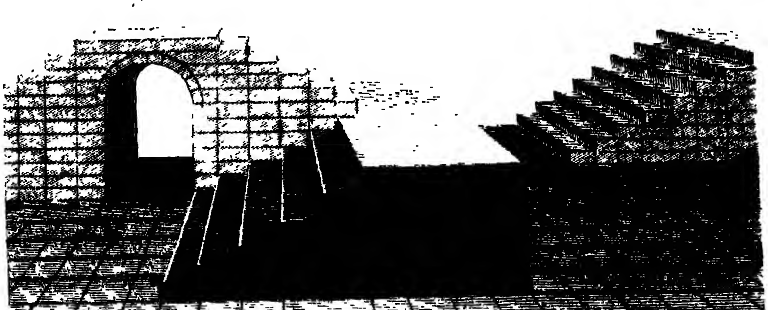


Fig. 4 Fig. 5



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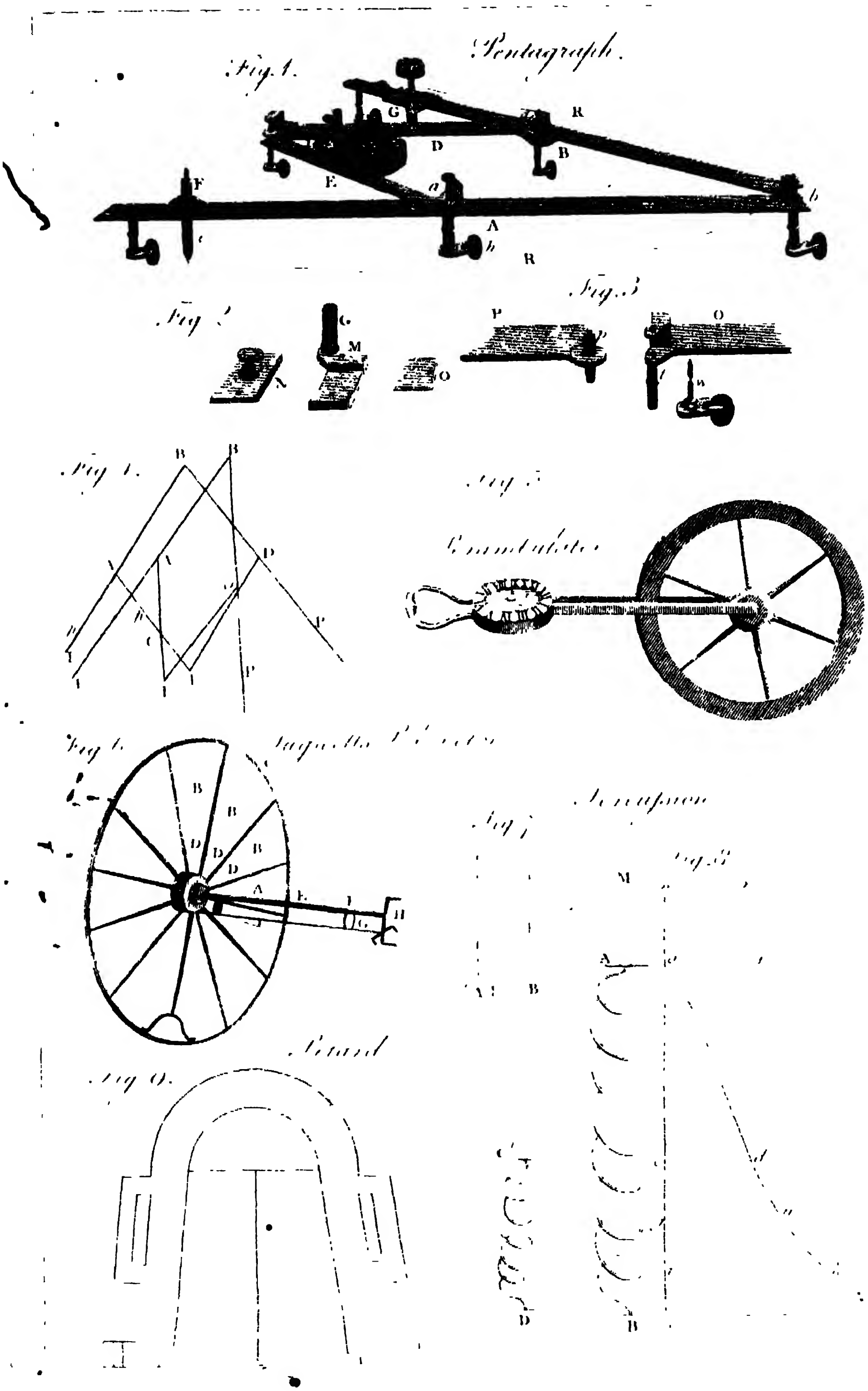
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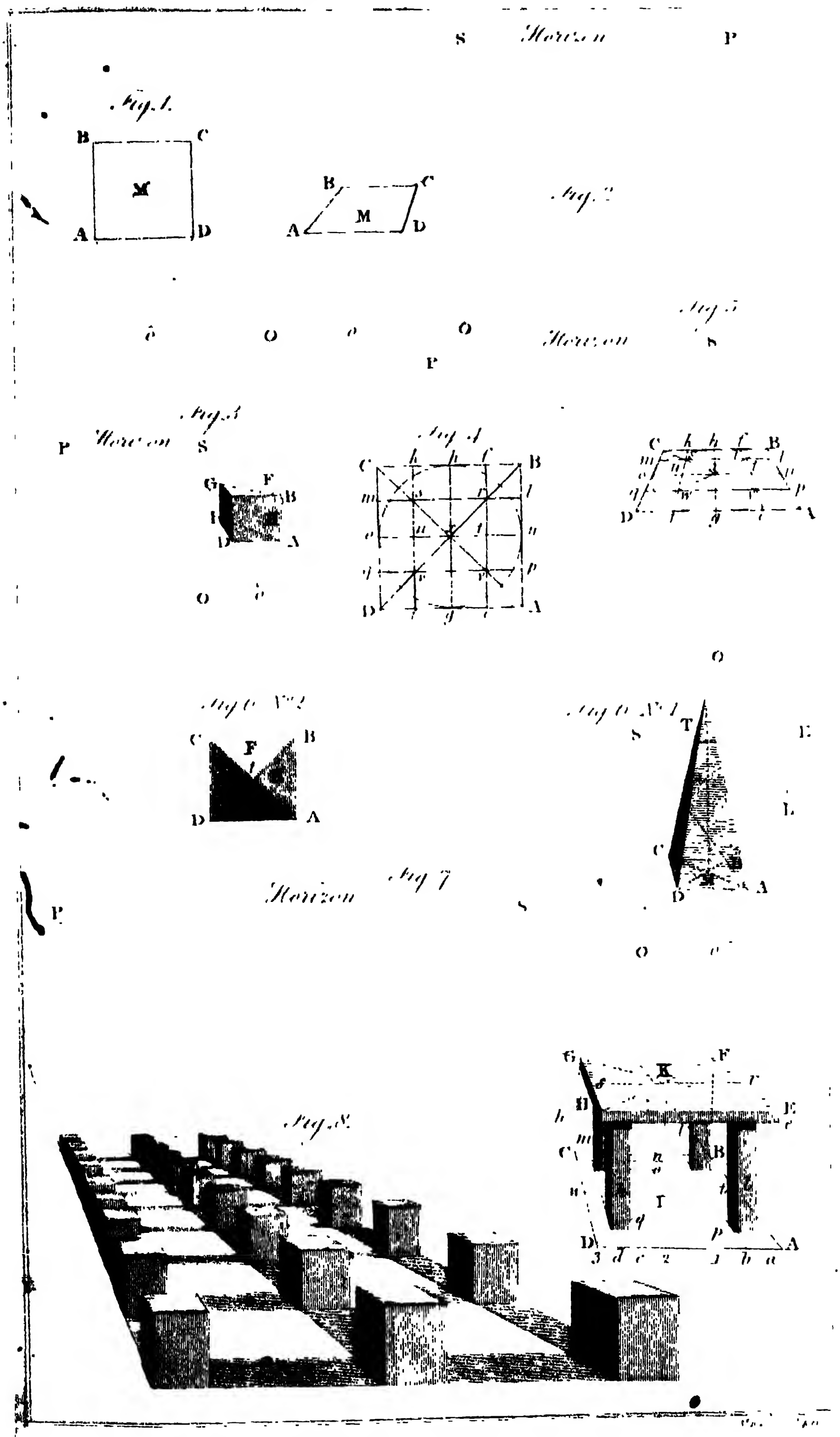

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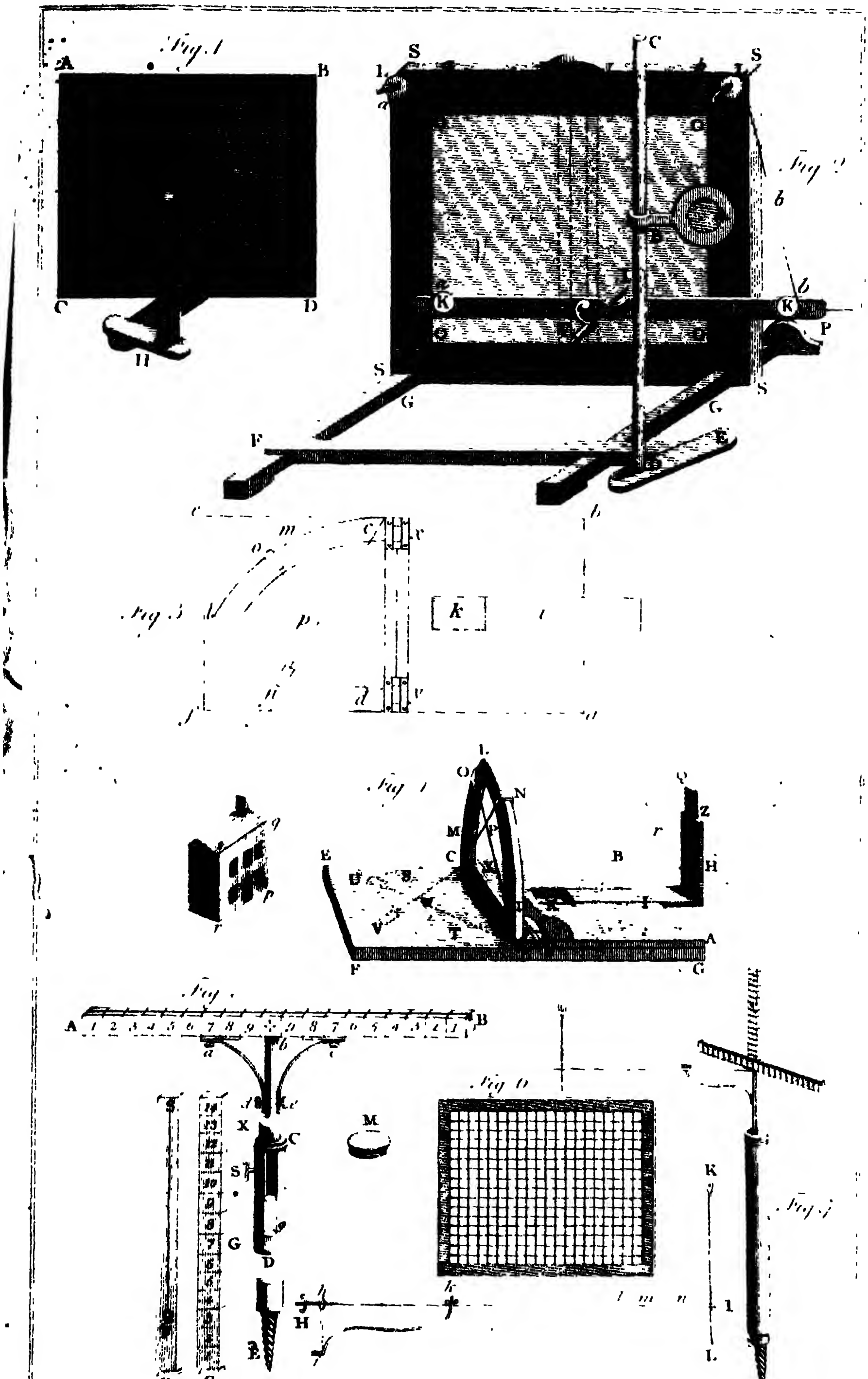
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